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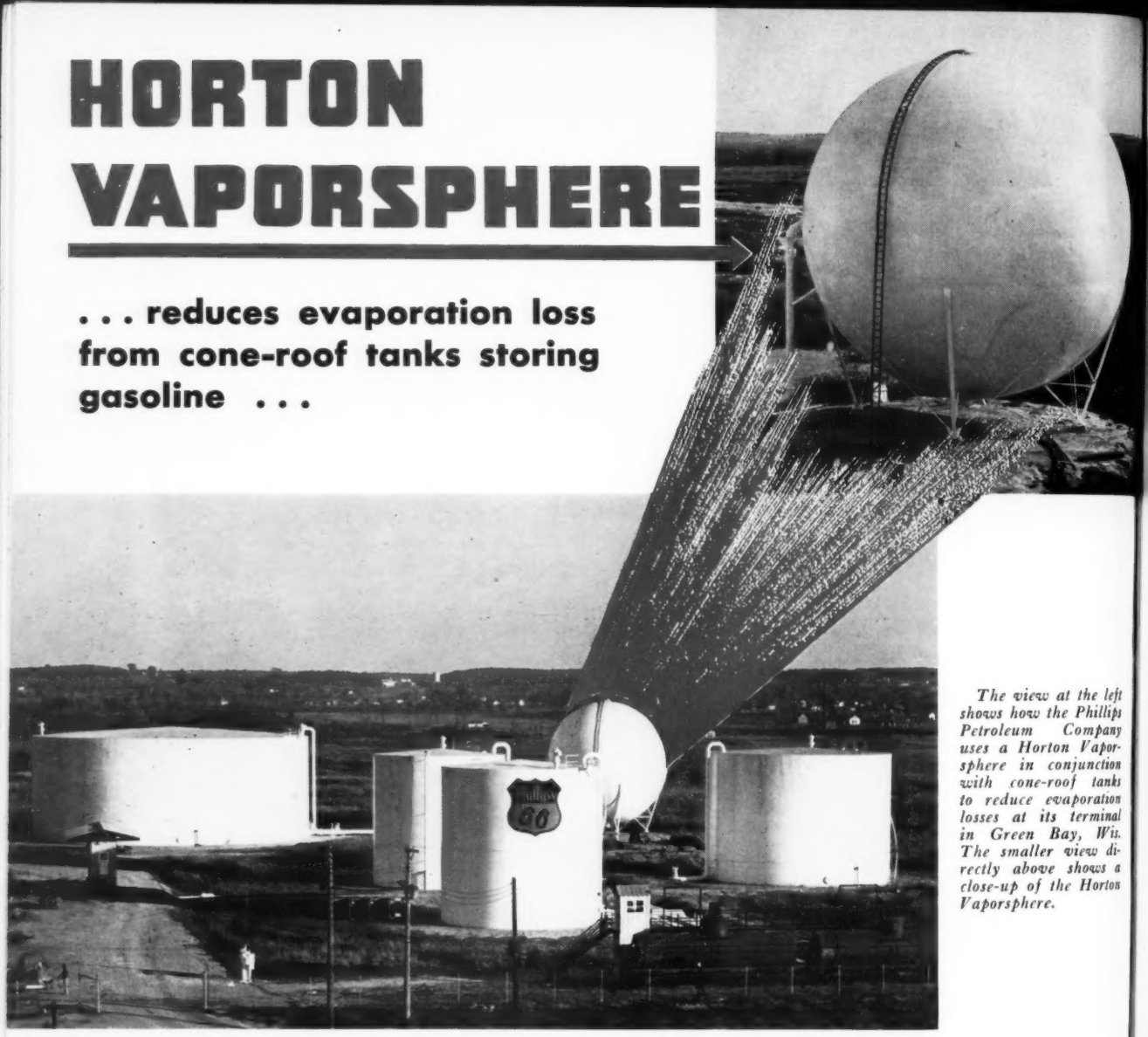
PRICE 20 CENTS TABLE OF CONTENTS PAGE 33 JUNE 3, 1948

# HORTON VAPORSPHERE

## . . . reduces evaporation loss from cone-roof tanks storing gasoline . . .



*The view at the left shows how the Phillips Petroleum Company uses a Horton Vaporsphere in conjunction with cone-roof tanks to reduce evaporation losses at its terminal in Green Bay, Wis. The smaller view directly above shows a close-up of the Horton Vaporsphere.*

The Phillips Petroleum Company uses a Horton Vaporsphere at its Green Bay, Wis., terminal to reduce evaporation losses. The Vaporsphere is connected to four cone-roof tanks, forming a vapor-saving system.

The Vaporsphere consists of a steel shell with a flexible, hemispherical membrane on the inside. The outer edge of this membrane is connected to the shell at the equator. Large-diameter piping connects the vapor spaces of the tanks to the Vaporsphere. When vapor is displaced from the tanks by breathing or unbalanced filling, it flows into the Vaporsphere. The membrane billows upward and the incoming vapor is stored between the membrane and the lower half of the shell of the Vaporsphere until the conditions which caused its displacement are reversed. It then returns to the tanks. Vapor does not escape from the system under normal operating conditions, hence there are no breathing losses.

The following table shows how the evaporation losses with a vapor-saving system compare with the losses from cone-roof tanks. Calculations are based on cone-roof tanks averaging 1/3 full storing 10-lb. Reid vapor pressure gasoline at 56° F.

| TANK CAPACITY | EVAPORATION LOSSES IN BARRELS OF 42 U. S. GALLONS | | | |
|---|---|---|---|---|
| | GAS-TIGHT CONE-ROOF TANK | | GAS-TIGHT CONE-ROOF TANK AND VAPORSPHERE | |
| | Annual Breathing | One Filling | Annual Breathing | One Filling |
| 40,000 | 960 | 60 | 0 | 48 |
| 80,000 | 1700 | 120 | 0 | 96 |

*Formulae and engineering tables for determining the correct capacity Vaporsphere, the correct diameter of the vapor lines and other necessary data to design a vapor-saving system to meet your particular requirements are found in our new Bulletin D.*

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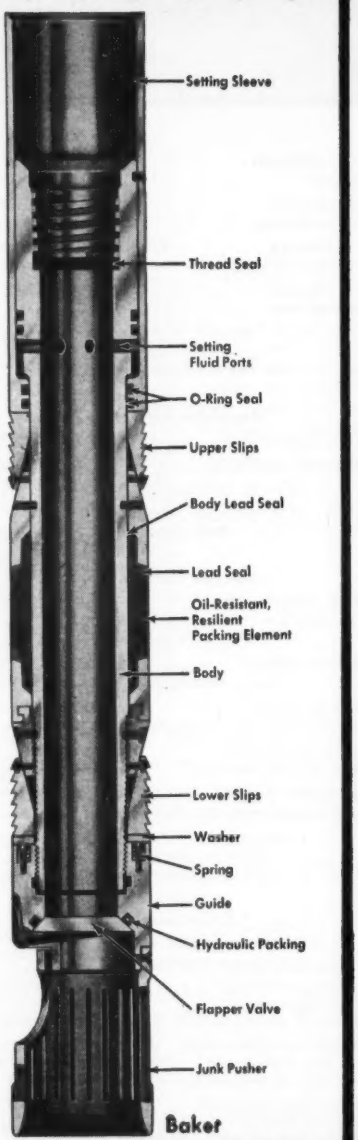


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THE OIL AND GAS JOURNAL

# Shocking Proposals

THE shocking proposals of Louisiana's new governor for much higher taxes on crude oil, natural gas, and gasoline, part of which have already been approved by the state's lower house with no hearings or study, come as a stunning surprise to the oil industry generally.

It was thought that the oil states, cooperating nationally under the Interstate Oil Compact Commission, had all come to realize their common responsibility to the entire citizenship of the country and to the oil industry. Opponents of state control are constantly endeavoring to establish their main contention that the nation's oil resources are being developed solely in the interest of the states in which they happen to be located with tens of millions of consumers everywhere paying the bills.

Louisiana is now playing into the hands of these proponents of federal controls. The new administration expects to triple present excise crude-oil taxes and double that on natural gas. The gas-gathering tax is to be increased 2½ times and the gasoline tax is to be boosted to 9 cents, higher than that of any other state. Other legislation inimical to oil producers is pending and scheduled for immediate passage.

Present oil and gas taxes account for more than half of the state's revenue. The incumbents now lay themselves open to the charge that they seek to perfect a costly political machine with additional spending to come from more taxes levied on the oil and gas industries and their customers.

If they will review the recent political history of the state those in power will find the facts enlightening. The development of the state's oil and other resources was delayed because oil producers and business generally feared the political atmosphere prevailing over a several-year period.

More recently state government conditions have improved and there has been a widespread expansion in petroleum activities so that Louisiana is now well entrenched as the country's third largest oil producing state. Refining facilities have increased with important new plants. This has resulted in increased state and local revenue on the sound basis of expanded operations. Growth in primary and the costly secondary operations will continue to expand unless there is a return to political uncertainty.

There is every reason to believe that Louisiana's tidelands will be productive over a wide area. Right now the oil states seek national legislation which will assure state ownership. Louisiana needs the support of every consuming state as well as the other oil states in nullifying this latest attempt to extend federal ownership and control.

They say that Governor Earl Long is "realistic" politically. If he is, he will drop these tax proposals quickly and see what he can do to aid the state's oil business and not permanently cripple it.

# Approval of Big Gas Pipe Line Indicates FPC Deadlock Ended

***by Henry D. Ralph***

APPROVAL of the Federal Power Commission of the plan of Trans-Continental Gas Pipe Line Co., Inc., to build an 1,800-mile, 26-in. diameter pipe line from Texas to New York opens new markets for Southwest gas, promises some relief from fuel shortages in the Northeast, and indicates that the FPC has resolved its policy deadlock in favor of wide distribution of natural gas.

Conditional authority to construct "the largest and most costly natural-gas project" ever to come before it was granted by the commission May 29. The application had been pending since December 1946 and was the subject of prolonged hearings last fall and winter at which it was vigorously opposed by coal and railroad interests and by Texas Eastern Transmission Corp. which purchased the war-built Big Inch pipe-line system and operates it in gas service to Philadelphia with plans for an extension to the New York Harbor area.

Trans-Continental Gas Pipe Line Co., which has its head office in Longview, Tex., was organized by Claude Williams, Austin attorney, and others for the purpose of submitting a bid on the Big Inch system, but later filed application to construct its own line on a more southerly route.

At that time, and for several years previously, the Federal Power Commission looked with disfavor on proposals to transport large volumes of natural gas into eastern areas already served with other fuels. While there had never been a direct test case, several FPC opinions suggested that no such project would be approved. War conditions forced approval of the Tennessee Gas Transmission line to augment dwindling supplies of natural gas in the Appalachian area, and the commission had virtually no alternative to approval of conversion of the Big Inch system to natural gas after its sale by War Assets Administration.

### Commission Was Split

The natural-gas investigation, begun by FPC during the war and concluded only this spring, pointed up the arguments for and against long-distance gas transmission and the commission was very much divided on the subject, with two of the commissioners favoring it and two opposing.

Against this background, approval of the Trans-Continental project is most significant.

In granting the construction certificate, FPC imposed the condition that Trans-Continental make a further study of the possibilities of underground storage of gas during off-peak seasons, and report on this within 2 years. One of the chief arguments against long-distance transmission is that gas is "dumped" for boiler fuel at low rates during the summer in order to maintain capacity operations. Adequate off-peak storage would go far in meeting this complaint.

FPC also required the company to start actual construction within 1 year and to complete it within 28 months. It must submit a satisfactory plan for financing the line before the approval becomes final, and 6 months before starting operations must submit a rate schedule for FPC approval.

### To Cost $150,000,000

The project is estimated to cost between $150,000,000 and $180,000,000. It will have a normal capacity of 325,000,000 cu. ft. of gas daily, which may be boosted to 340,000,000 cu. ft. daily in peak load periods. The commission said the line will benefit 4,000,000 utility customers in the Middle Atlantic area and will take the place of at least 629,000,000 gal. of fuel oil.

Last March FPC suspending the hearings on the ground that Trans-Continental had not demonstrated that it had sufficient reserves of gas to provide full requirements for the 15-year contracts it proposed to sign with its customers. Later the case was reopened and the company showed that it had negotiated additional contracts with suppliers and has estimated reserves for a 20-year period of more than 2½ trillion cubic feet.

The company plans to originate its line in the Rogers Lacy field near Mercedes, Tex. Among the fields from which it will take gas are McAllen, La Blanca, and San Salvador in Hidalgo County, Texas; La Gloria, Sun, Alice, Ben Bolt, Banderra and others in Brooks and Jim Wells counties, Texas; Pledger in Brazoria and Matagorda counties, Texas; Egan in Acadia Parish, Louisiana; and West Gueydan in Vermilion Parish, Louisiana. Much flared gas will be obtained from oil fields along the route.

The line is planned to parallel the Gulf Coast in Texas about 75 miles inland to near Baton Rouge, La., will then run northeasterly to Atlanta, Ga., northward serving communities in the Carolinas, Virginia, Maryland, and Delaware, and will find its principal markets in Philadelphia, New Jersey, New York City, and Brooklyn. The gas will be sold principally to utility companies and used to enrich and supplement manufactured gas. Most of the areas where Trans-Continental will market have little or no natural gas at present.

## FPC Asks More Steel For Gas Transmission

WASHINGTON.—The Federal Power Commission and eight state regulatory commissions in the Midwest and the Appalachian area last week called upon the steel advisory council to take steps to assure pipe for natural-gas lines under the voluntary steel-allocation program.

A letter signed by Nelson Lee Smith, FPC chairman, and officials of Illinois, Indiana, Kansas, Michigan, Missouri, New York, Ohio and Pennsylvania was sent to John Virden, director of the Office of Industry Cooperation, in which it was pointed out that last winter emergency curtailments and allocation of gas were required in states served by one of the larger pipe-line companies and that curtailments also were necessary on various other natural-gas systems.

The resultant interruption of service to industrial consumers "seriously disrupt the economy of some of the communities in which industries are located and the production of materials important to the national economy," it was pointed out.

The commissioners told Virden that 9,596 miles of interstate natural-gas pipe line, involving 1,967,100 tons of steel, was authorized between July 1, 1945, and January 15, 1948, but, they said, "despite the authorization of this great increase of interstate pipe-line construction the pipe-line companies have not completed and placed in operation any substantial portion of the facilities authorized.

"The delay in construction and alleviation of the serious shortage of natural gas to consumers is due principally to the unavailability of steel," they declared.

At the same time representatives of steel producers appeared before the House interstate commerce committee to testify that the steel industry will not be able to meet all demands for line pipe. W. F. McConnor, vice president of National Tube Co., estimated that 2,000,000 tons of pipe production has been lost since the war ended in August 1945, because of fuel shortages, work stoppages, and other handicaps.

# Interior Fund Requests Sharply Cut in Bill

WASHINGTON. — The House last week passed and sent to the Senate a $375,000,000 Interior Department appropriation bill for the fiscal year beginning July 1 after whittling down the department's estimate for practically every project.

The House appropriations committee cut $84,000,000 off the department's suggested budget but gave it, nevertheless, $112,876,000 more than it has for the current year.

During its hearings on the bill, the committee commended Oil and Gas Division Director Max W. Ball on his excellent "off the cuff" presentation of his monetary needs, but the commendation was all he did get for the committee refused to grant the $400,000 he asked and held the division down to the $300,000 it was given this year, earmarking $175,000 of it for Connally Act enforcement. The original allowance for this year was $275,000, but a deficiency appropriation of $25,000 was recently granted and continuance of that increase, the committee reported, "is warranted in view of the critical situation in connection with the oil supply and the need for coordination and unification of policy by the federal Government which will aid industry in its efforts to produce a greater supply of oil and gas."

The Bureau of Land Management was given $2,562,565 for management, protection and disposal of public lands, an increase of $177,925 over this year but $825,000 less than requested, but the committee ordered the discontinuance of its five regional offices, which it declared have been inefficient in the adjudication and approval of oil and other leases, although permitting continuance of the district offices.

The Geological Survey was given $2,500,000 for geologic surveys, an increase of $200,000 over the current fund but $488,000 less than requested, and $675,000 for its mineral leasing activities, $25,000 over this year and $35,000 less than estimated.

In dealing with the Bureau of Mines, the committee cut the fund for synthetic liquid fuels from the $9,750,000 requested to $7,250,000, which is $250,000 more than currently available, but explained this action was based on the assumption that not more than this amount will be required during the year and gave assurance that if additional funds become necessary they will be provided.

The committee allowed the bureau's full request of $606,000 for oil and gas investigations, an increase of $6,000; and $91,000 for helium utilization and research, an increase of $1,000.

*J. F. DRAKE*
*Board chairman*

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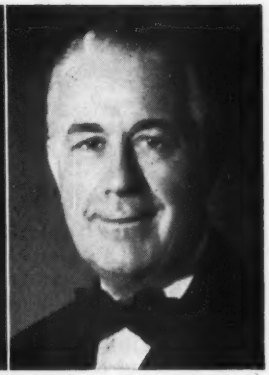
*President*



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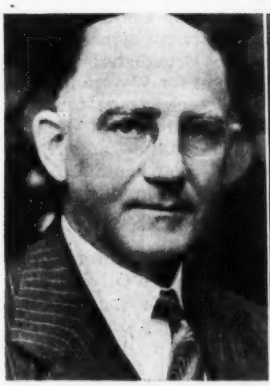
*Executive vice president*



*H. A. GIDNEY*
*Executive vice president*

*H. R. MOORHEAD, JR.*
*Treasurer*

*W. L. NAYLOR*
*Comptroller*

# Swensrud Becomes Gulf President

A SERIES of promotions changing the top management of Gulf Oil Corp. were announced at a meeting of the board of directors May 26 whereby J. F. Drake becomes chairman of the board and is succeeded as president by S. A. Swensrud.

W. L. Mellon, for 45 years the active head of the company, has retired as chairman of the board but will continue to serve as a director. He entered the petroleum business in western Pennsylvania in 1889, was active in Texas when Spindletop field was opened in 1901, and became vice president of Gulf Oil Corp. when the company was founded in 1907. He became president in 1909 and chairman of the board in 1931.

Drake joined Gulf in 1919 after serving as a Lieutenant Colonel during World War I, became vice president in 1923, and president in 1931. He is a director of a long list of companies, has been active in oil-industry organizations, and was a member of the Petroleum Industry War Council.

Swensrud joined the Gulf company, as executive vice president and director only a year ago, but previously he had 20 years in the oil business. After receiving a graduate degree from the Harvard School of Business Administration, he was made assistant to the president of Standard Oil Co. of Ohio in 1928, becoming a vice president in 1929 and executive vice president in 1946.

J. E. Nelson, promoted from treasurer to executive vice president, has been with Gulf since 1908 as assistant treasurer and treasurer.

H. A. Gidney, who has been with the company since 1920 as auditor and later comptroller, was also named an executive vice president.

New treasurer of the company is H. R. Moorhead, Jr., who joined Gulf in 1946 after serving with several New York banking firms and the U. S. Navy.

W. L. Naylor, who has been made comptroller, has been with Gulf since 1920, having served as auditor in Tampico, Mexico, and in the Pittsburgh office, and was made assistant comptroller in 1934.

# Rocky Mountain Reserves High, A. P. I. Production Group Told

CASPER, Wyo.—The need for new reserves and the fact that industry can supply them was emphasized by Frank O. Prior, vice president, Standard Oil Co. of Indiana, at the Rocky Mountain District American Petroleum Institute production meeting in Casper May 27.

"We have seen in the long range picture of supply that, in the Rocky Mountain area, the tidelands, other areas in this country, and in foreign areas, there are reserves sufficient to assure that the oil industry can meet demands," he asserted.

"Keeping pace with this new demand, the rate of growth of production and the discovery of new reserves is substantially higher in the Rocky Mountain Region than for the country as a whole," Prior said. "As a matter of fact, the amount of oil produced during the period of 1935 to 1947, inclusive, in Wyoming, Colorado, and Montana, is considerably greater than their proved reserves of January 1, 1935. Currently, only 7 per cent of the crude reserves in the Rocky Mountains is being produced each year as compared with 8.8 per cent for the average of the United States, thus indicating a somewhat greater oil bank, per barrel, produced in this area than the average for the country. Of much greater importance is the fact that during the last 13 years the increase in proven oil reserves in the Rocky Mountain area averaged 1,900,000 bbl. per wildcat well as compared to 655,000 bbl. for the nation. With increasing ability to drill deeper and deeper horizons and with the development of improved exploration tools, the petroleum producing industry of the Rocky Mountain area may well look forward to the future with confidence and with appreciation of the important role this area will play in the petroleum economy of the nation."

Prior pointed to improved refining methods as a means of utilizing more fully the black oils of Wyoming and said that the Rocky Mountain region appears to be particularly favored in the future of oil production.

Jake L. Hamon, of Cox and Hamon, Dallas, and vice president of the A.P.I. Production Division, advised the group that, "The most important element in the development of more efficient production practices in recent years is the acceptance by the industry of the principle of the prevention of physical waste in producing oil and gas." He pointed out that one of the oldest gas-drive operations is in the Salt Creek field, and that a good example of pressure maintenance is in the Wertz field, Wyoming.

### New Officers Elected

The 2-day meeting was well attended by operators from all Rocky Mountain States. At the election of officers on May 28, James C. Johnston, Rocky Mountain Division production manager for Continental Oil Co., was made district chairman; Z. K. Brinkerhoff, Jr., Brinkerhoff Drilling Co., vice chairman for Wyoming; Fred Manning, Jr., vice chairman for Colorado; W. M. Saxon, Pure Oil Co., vice chairman for Montana; and A. F. Barrett, General Petroleum Co., secretary-treasurer. Following were elected to the Advisory Committee: J. D. Anderson, Ohio Oil Co., chairman; R. L. Carruthers, California Co.; Calvin Cooksey, Carter Oil Co.; J. F. Cullen, Stanolind Oil & Gas Co.; R. B. Curran, W. H. Barber Co.; J. A. Deffeyes, Pacific Western Oil Co.; James Donoghue, MacKinnie Oil & Drilling Co.; H. B. Gernert, The Texas Co.; Frank L. Lovering, Phillips Petroleum Co.; M. R. McArthur, Husky Refining Co.; Claude E. Peavy, Wasatch Oil Refining Co.; H. A. Stewart, The Texas Co.; and Percy Tallant, Union Oil Co. of California.

At the second day of the meeting, papers concerning production problems in the Rocky Mountains were presented. H. A. True, Jr., The Texas Co., discussed "Production Problems —The Adon Block in the Powder River Basin," concerning deep production problems encountered in completing the recent discovery in that area. He said that a well drilled last year by The Texas Co. in Campbell County aroused considerable interest because it was the first well to encounter commercial production in the heart of this tremendous basin. He described the characteristics of the oil, gas, and reservoir sand, and told of the difficulties experienced in completing the well and obtaining production from the saturated zone.

Secondary recovery in the Rocky Mountains was discussed by C. M. Nickerson, U. S. Geological Survey engineer at Midwest, Wyo., who said that this has been limited to gas injection, but two or three experimental water-flooding projects are now under way. These latter are in the Cole Creek and Salt Creek fields in Wyoming, and have yielded encouraging results.

A paper on "What Engineers Expect of Management" was given by Fred M. Clement, regional engineer for Continental Oil Co., based on the results of a questionnaire he sent to petroleum engineers in the Rocky Mountain area.

In afternoon sessions "The Development of Mush Creek" was presented by J. A. Ziser of Phillips Petroleum Co., and "Employer - Employee Relations" were discussed by John McNulty, personnel director for Ohio Oil Co. at Casper.

# Arabian Pipe Eyed as Export Quotas Are Set

WASHINGTON.—Authorization for the export this month of 15,000 tons of pipe for the Trans-Arabian pipe line is expected to be granted by the Office of International Trade, and Chairman Kenneth S. Wherry of the Senate small business oil subcommittee plans to call on Defense Secretary James V. Forrestal for a definite answer whether construction of the line is going to be continued.

Forrestal, who, on March 17, promised to give an answer within 48 hours, never has said whether the military favored completion of the line, which he admitted could not be defended against attack.

Last week Wherry said his committee had unofficial information that 15,000 tons of pipe would be shipped to Saudi Arabia this month, which would bring shipments for the second quarter to 18,000 tons. The company had asked for permits to move 55,000 tons of steel during the quarter.

At a previous hearing, Commerce Department officials agreed to hold up Tapline licenses, and the committee immediately queried both the department and the Navy and was informed no authorization has been issued for the 15,000 tons.

A member of the committee's staff, however, expressed the opinion the license would be granted, and said that three vessels on which the pipe would be shipped are now en route to American ports to pick it up. He said also he had no doubt that when Forrestal did reveal his position, it would be in favor of putting the line through despite the opposition which has been offered.

On the heels of the flurry over this 15,000 tons, the Office of International Trade announced that the second-quarter export quotas for oil pipe would consist of 55,000 tons of seamless and 35,000 tons of welded casing and oil-line pipe, and 5,500 tons of seamless black pipe other than casing, oil-line, and boiler. OIT officials said more than 75,000 tons was earmarked for special projects, which would include the 3,000 tons already shipped and any further tonnage authorized for the Trans-Arabian line.

# this week

**STEEL**—Congress probes ability of steel industry to meet oil-industry requirements but finds no solution. . . . Told tubular goods may be sufficient to meet drilling program but little hope of meeting demands for line pipe. . . . ¶FPC asks agencies to allocate more steel for gas projects to alleviate fuel shortages in East. . . . ¶Steel expert says trend to large-diameter pipe lines is chief cause of trouble as few mills can roll big pipe. . . .

**NATURAL GAS**—In important policy decision Federal Power Commission approves construction of 1,800-mile Texas-New York pipe line by Trans-Continental Gas Pipe Line Co. . . . Will cost more than $150,000,000, take 325,000,000 cu. ft. of Texas and Louisiana gas to Middle Atlantic seaboard, due for completion in about 2 years. . . . ¶National Security Resources Board launches study of ability of gas industry to meet defense requirements. . . .

**PIPE LINES**—Magnolia Pipe Line Co. begins filling new crude line between Texas and Illinois. . . . Company's schedule calls for transporting 100,000 bbl. daily. . . . ¶Sunray Oil Corp. now using its new products line between Duncan and Allen, Okla., shifting charging stock and products between its refineries at each end of line. . . . ¶Socony-Vacuum will start this month on construction of new products line between Portland and Bangor, Me.

**INTERNATIONAL**—Crude-oil production in Argentina increasing as result of Y.P.F. drilling program. . . . Government company drilled 110 development wells in 1947 and 10 wildcats of which 5 produced oil and 1 was a gas well. . . . ¶Shell group dedicates large new laboratory in England for extensive fuel research. . . .

**REFINING**—Socony-Vacuum advancing rapidly with expansion of its refinery at Casper, Wyo., scheduled for completion by December. . . . Will double present capacity of 3,000 bbl. daily and add catalytic polymerization unit. . . . ¶Allied Oil Co. opens new marine terminal on Ohio River in Pennsylvania. . . .

**TRENDS**—Crude-oil production for week ended May 29 sets another all-time record high with average daily production of 5,440,225 bbl. . . . New record output is 9,580 bbl. daily over revised total production of previous week. . . . ¶Average crude and condensate production this year including week ended May 29 is 5,437,000 bbl. daily as compared to similar period last year of 4,871,000 bbl. . . . An increase of 11.6 per cent. . . . ¶All wells drilled in first 22 weeks this year total 14,485, an increase of 19.5 per cent over the 12,123 drilled in comparable period last year. . . . ¶Accumulated footage drilled in the same period totals 50,700,000 ft., an increase of 19.1 per cent compared to the 42,600,000 ft. drilled last year in the same period. . . . ¶The 2,292 wildcats drilled this year to week ended May 29 represent a gain of 25.1 per cent over the same period a year ago. . . . ¶Stocks of the four products increase 1,957,000 bbl. in week ended May 22 over previous week. . . . Figure represents decrease in gasoline stocks and increases in kerosine, distillate, and residuals. . . . Stocks of all four products were approximately 27,000,000 bbl. above same period last year. . . .

*While parliamentary tactics delay Congressional action on ownership of offshore oil lands, the industry is pressing ahead with development in the Gulf of Mexico. Here is the huge drilling platform of Humble Oil & Refining Co. in 50 ft. of water 8 miles off Grand Isle, Jefferson Parish, Louisiana, which discovered a new salt dome and a promising show of oil sand and is still drilling to test deeper formations. The same company is completing another platform a mile away on the same geological structure, and three others off the Louisiana coast*

# Prospects of Defeat of Record Oil Taxes in Louisiana Fade

BATON ROUGE.—The prospects of defeat or even substantial modification of the new record high oil and gas taxes now in the Louisiana Legislature appeared dim early this week.

Steamroller forces of Earl K. Long, new Louisiana governor, apparently adopted the strategy of quickly pushing the bills to passage before the opposition could consolidate.

Last week the Louisiana House of Representatives passed five of the administration's tax bills in rapid-fire fashion. Among them were three bills increasing the tax burden carried by the oil industry.

One of these virtually triples the severance tax on oil and provides a 19-cent-per-barrel increase on high-gravity crude oil. It also doubles the present 0.3-cent-per-1,000 cu. ft. tax on natural gas. Another measure quadruples to 2 cents the gas-gathering tax. A third bill raises Louisiana's motor-fuel tax to 9 cents, highest in the nation, and a pump price of about 32 or 33 cents per gallon for regular grade was expected with enactment of the increase.

A house committee hearing on the oil and gas production tax increase bills had been originally set for Thursday. The committee moved the hearing up to 9 p.m. Monday, heard two witnesses favoring the bills, and reported them with a 17-1 and a 16-2 vote for approval.

Representatives of the petroleum industry were hoping for more consideration in the upper branch of the legislature. However, following an executive session of the Senate which was addressed by Governor Long, that body passed a resolution agreeing to support the increased severance and gas-gathering taxes.

The increased severance tax was passed by the Louisiana House by a vote of 84 to 6 with 10 members not voting. The gas-gathering tax was voted by a count of 86 to 5 with 9 members not voting. Louisiana's present gas-gathering tax expired this year, and in passing the increased levy, the House struck out a provision calling for an expiration of the new tax in 1952.

Besides the three measures affecting the oil industry, the House voted two other tax increases, one doubling the sales tax to 2 per cent and another levying a 5-cent-per-bottle tax on beer. Discussion was largely confined to the bill raising the gasoline tax to 9 cents, which with the 1½-cent federal tax, makes the total levy 10½ cents.

In opposing the tax, Rep. Charles F. Duchein, East Baton Rouge Parish, said: "When the total tax on one commodity approaches almost half the cost, the red light is turned on for us to stop and consider what we are doing. Every time the bell rings for the purchase of 10 gal. of gasoline, the purchaser will be paying $1.05 in taxes.

"The bill also will work a hardship on dealers in border communities. Texas has a state tax of 4 cents, Arkansas 6½ cents, and Mississippi 6 cents."

The executive committee of the Arkansas-Louisiana division of the Mid-Continent Oil and Gas Association met in Shreveport and issued a statement protesting the new petroleum-industry taxes.

The association pointed out that the higher taxation will force premature abandonment of many small wells to the detriment of the producers, landowners, royalty owners, and state alike. Deeper drilling, the association statement said, will receive a setback because "even the present higher price of crude oil does not provide a sufficient margin to absorb the proposed increase. . . . Operation capital in the oil and gas business will be employed in those areas which promise a fairer return on the investment and will seek to escape discriminatory taxation."

At present the petroleum industry's operation pays more than half of all revenue received by the state, and the new legislation will push tax rates far above those of any of the other 23 producing states. Louisiana is now producing about 465,000 bbl. daily, and the 1947 yield on the oil and gas severance taxes alone was $18,020,805.

***Most New Orleans filling stations and many others elsewhere in the state locked their pumps for 1 day last week in protest against a plan now before the Louisiana Legislature to increase state gasoline taxes 2 cents a gallon. The additional tax, backed by the new administration of Gov. Earl K. Long, would make Louisiana's total 9 cents, highest in the nation. Governor Long's program requires several drastic tax increases. Severance taxes on gas and oil are to be doubled and tripled. This would add another cent to gasoline prices in addition to the proposed 2-cent increase***

## New Mississippi Board Preparing to Function

JACKSON, Miss.—Mississippi's new five-man State Oil and Gas Board, of which James McClure of Sardis is chairman, will hold its first hearing on June 21.

The hearing will be on a petition filed by Gulf Refining Co. and United Gas Pipeline Co. seeking changes in the rules governing "overages and underages" in gas flow of Gwinville field in Jeff Davis County, Mississippi.

On June 15 the board will visit the El Dorado, Ark., headquarters of the Arkansas Oil and Gas Commission to inspect the work of that agency and to determine how the Arkansas law works. The Mississippi officials will sit in on a hearing of the board and remain over for a conference with Arkansas officials.

*Pictured at the joint technical meeting of Standard Oil Co. (Ind.) and subsidiaries are (top) W. H. Bahlke, research coordinator, Standard Oil Co. (Ind.); D. G. Zink, manufacturing department, Stanolind Oil & Gas Co.; R. H. Price, director of research, Pan American Refining Corp.; E. W. Thiele, assistant director of research, Standard Oil Co. (Ind.); W. G. Whitman, M.I.T. consultant; C. F. Feuchter, manufacturing department, Pan American Refining Corp.; (bottom) W. G. Whitman, head of chemical engineering department, M.I.T., consultant; J. K. Roberts, general manager of research; W. B. Plummer, manager chemical products department; T. H. Rogers, director of research, all of Indiana Standard; F. R. Clark, manufacturing manager, and A. W. Neeley, director of research, Utah Oil Refining Co.*

# Indiana Standard Brings 225 Men For Technical Staff Conference

THE sixth annual joint technical meeting of Standard Oil Co. (Ind.) and five subsidiaries brought 225 technical men to French Lick Springs, Ind., for a 6-day conference last week.

In attendance were research scientists and their colleagues engaged in engineering, manufacturing, exploration, production, patent work, sales technical work, and related economic studies. Subsidiaries represented were Pan American Petroleum & Transport, Pan American Petroleum Corp., Root Petroleum Co., Stanolind Oil & Gas Co., and Utah Oil Refining Co.

A total of 84 scientific papers were presented, dealing with such subjects as new catalysts for making gasoline from natural gas or from heavy oils, methods of selecting feed stocks that permit catalytic cracking equipment to run well above its rated capacity, application of improved electronic instruments to oil-industry problems, methods of separating crude oil into specialized fractions for particular jobs, and new methods of removing sulfur and other impurities.

New products described included improved motor oils for use at subzero temperatures, additives for improving the viscosity index of lubricating oils, multipurpose greases, petroleum-base adhesives, new plasticizers for vinyl and other resins, high-solvency naphthas, high-molecular-weight alcohols, and alkane sonfonic acids now going into production for uses in the chemical-process industries.

The conference also spent considerable time discussing economic studies of industry-wide supply problems and long-range trends in consumer requirements.

The sessions included a banquet addressed by Joseph Pursglove, Jr., vice president of Pittsburgh Consolidation Coal Co., which is a leader in research directed toward manufacture of gasoline and other petroleum products from coal. He predicted that in the future the availability of energy resources will be more in proportion to the size of reserves, and that the country will depend more and more on coal with a relatively smaller percentage coming from petroleum and natural gas.

## Oil Engineers to Study Terminal Island Sinking

LOS ANGELES.—A number of oil company engineers will serve on Navy and municipal committees being appointed to study the subsidence of Terminal Island in the harbor here, site of Wilmington oil field and a large naval base.

Terminal Island, a man-made island, has been sinking gradually since 1937 and has subsided as much as 7½ ft. in some places. The rate of sinking appears to be growing greater each year and has caused severe damage to the fleet base and industrial plants. Oil operations have not been seriously hampered to date as pumping units have been jacked up to compensate for the sinking but further sinking might cause the loss of wells due to collapse of casing or holes becoming too crooked to be pumped by ordinary means.

Petroleum engineers discount a local theory that the subsidence is due to withdrawal of oil from below the island but are joining in a study being made by the Navy and harbor authorities. Serving on the naval advisory group are C. H. Keplinger, petroleum engineer of Keplinger & Wannemacher Co., Tulsa; E. L. Davis of Signal Oil Co., and H. T. Wayatt of the oil development department of Union Pacific Railroad. Other representatives will be named from other oil companies operating in the area.

# International

WORLD-WIDE OIL DEVELOPMENTS

# Argentine Crude Output Increasing Under Y. P. F. Drilling Program

*by Warren W. Burns*

CRUDE oil production in Argentina totaled 21,841,000 bbl. during 1947, an average of 59,800 bbl. per day, of which Yacimientos Petroliferos Fiscales (Argentine Government Oil Fields) produced 41,900 bbl. per day.

The total is some 3,000 bbl. daily higher than the 1946 production but is still below that of 1945 in spite of a drilling program conducted by Y.P.F. which resulted in the completion of 10 wildcat and more than 100 development wells last year.

Further development of Argentina's petroleum resources will depend entirely on the efforts of Y.P.F., since private interests have been prohibited from wildcatting for several years and have been granted no new concessions or extension of land areas.

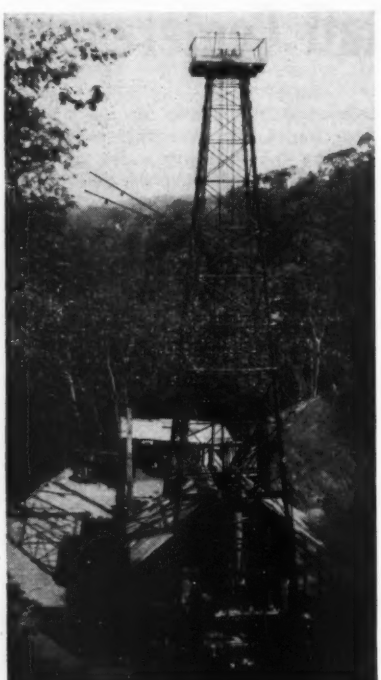
The remaining 17,900 bbl. per day output during 1947 was produced by private interests from their old concessions in Argentina, and was divided approximately as follows: Diadema Argentina S. A. de Petroleo (Royal Dutch-Shell), 10,700 bbl.; Astra (Cia. Argentina de Petroleo S.A.), 2,300 bbl.; Standard Oil Co. S.A. Argentina, 2,200 bbl.; and Cia. Ferrocarrilera de Petroleo, 2,700 bbl.

The 1947 Argentine figures in the accompanying tables are official Y.P.F. figures, given to the petroleum division of the American Institute of Mining and Metallurgical Engineers. The original figures were in metric tons and cubic meters. Ray Walters, foreign production executive with Standard Oil Co. (N. J.) and a co-chairman of A.I.M.E.'s 1948 annual meeting, had these figures converted to barrels and cubic feet and also supplied data for Standard of Argentina. Figures for the other three companies were, in part, estimated on the basis of reliable reports.

Last year Y.P.F. increased its drilling activities, having completed 105 new wells, representing a total of 485,600 ft. drilled, or an increase of 29.44 per cent over 1946.

Wildcatting activity dropped in 1947. Of 10 wildcats drilled by Y.P.F., five were brought in as oil producers and one was a gas well. Y.P.F. exploration activities in four areas, last year, were as follows:

Santa Cruz: Three exploratory wells were drilled, and two core holes were completed, all of them located in the region of Caleta Olivia. Two of the wildcats were brought in as oil wells and the other as a gas well.



*A well of Standard Oil Co. of Argentina being drilled in Lomitas field, Salta area*

Neuquen: Five exploratory wells were drilled, three of them being in the Challaco zone, one at Senillosa and the other at Pampa Tril. Two of the wells at Challaco were productive. The others were abandoned.

Mendoza: An exploratory well on the Barrancas structure was completed in this province as a producer. Initial production had not been determined at the time Y.P.F. released its figures. This well was drilled to 8,111 ft. into the Brecha Verde horizon.

Salta: The only exploratory well drilled in this province was at Solazuti. It was abandoned at 3,035 ft. in the third sub-Andian horizon.

Details of the Y.P.F. exploratory drilling program are shown in Table 1.

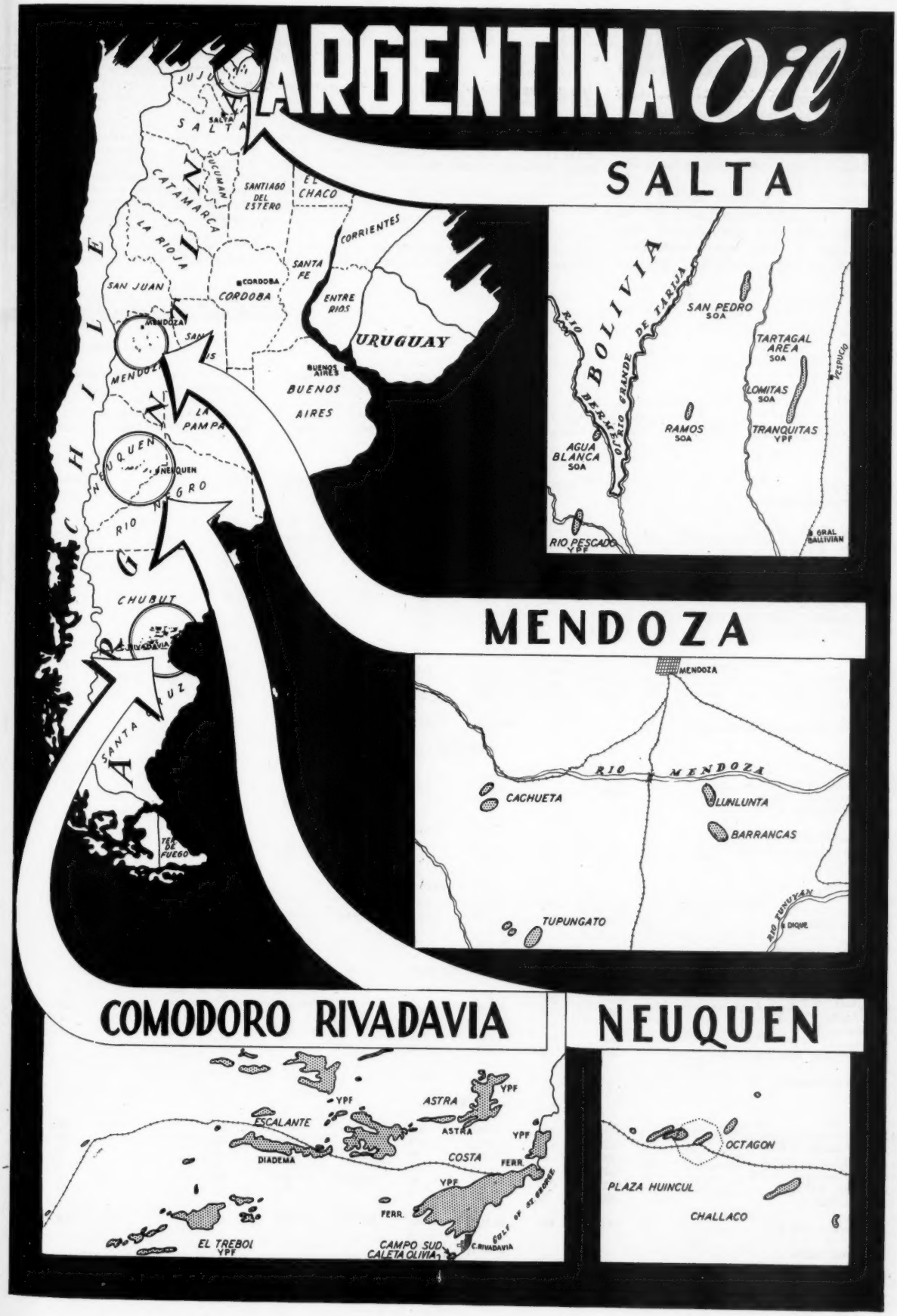
Y.P.F.'s development activities last year are summarized in Table 2.

Y.P.F.'s 1947 production of 15,257,000 bbl. or approximately 41,900 bbl. daily, represents an increase over its 1946 output of 7.3 per cent. Total production in the four regions in which Y.P.F. operates and the percentage of increase over 1946 was:

Comodoro Rivadavia: Fields there produced 9,913,900 bbl., an increase of 1,166,800 bbl. (13.3 per cent). The greater part of this came from Canadon Seco where there was a substantial increase. In part the increased production was due to the renovation of pumping equipment, as well as the contribution made by new wells.

Plaza Huincul: Production here totaled 2,024,900 bbl., representing an increase of 88,300 bbl. (4.6 per cent). The increased production was due to completion of several new wells whose individual yield was also greater.

Salta: Production here totaled 471,500 bbl., representing an increase of 4,900 bbl. (1 per cent).


ARGENTINA Oil
SALTA
BOLIVIA
RIO BERMEJO
RIO GRANDE DE TARIJA
SAN PEDRO SOA
TARTAGAL AREA SOA
LOMITAS SOA
RAMOS SOA
TRANQUITAS YPF
AGUA BLANCA SOA
RIO PESCADO YPF
GRAL SALLIVIAN
PILCOMAYO
MENDOZA
MENDOZA
RIO MENDOZA
CACHUETA
ILUNILUNTA
BARRANCAS
TUPUNGATO
RIO TUNUYAN
DIQUE
COMODORO RIVADAVIA
YPF
ESCALANTE
ASTRA
DIADEMA
COSTA
FERR.
EL TREBOL
CAMPO SUD
CALETA OLIVIA
C. RIVADAVIA
GULF OF ST GEORGE
NEUQUEN
OCTAGON
PLAZA HUINCUL
CHALLACO
CHILE
ARGENTINA
SALTA
JUJUY
TUCUMAN
CATAMARCA
LA RIOJA
SAN JUAN
MENDOZA
SAN LUIS
SANTIAGO DEL ESTERO
EL CHACO
CORRIENTES
SANTA FE
CORDOBA
ENTRE RIOS
BUENOS AIRES
URUGUAY
LA PAMPA
NEUQUEN
RIO NEGRO
CHUBUT
SANTA CRUZ
TIERRA DEL FUEGO

Mendoza: Production here totaled 2,847,600 bbl., representing a decrease of 216,000 bbl., or 7 per cent. Y.P.F. attributed this to relatively little drilling activity.

Standard of Argentina drilled only four development wells last year. In 1946 this company also drilled four wells and a fifth was suspended. Standard of Argentina's 1947 produc-

**TABLE 1—WILDCAT DRILLING BY Y.P.F. IN 1947**

| Location— | Total depth, ft. | Surface formation | Deepest horizon tested | Initial prod., bbl. oil per day |
|---|---|---|---|---|
| Gob. Chabut, CR. 021 | 6,317 | Patagoniano | Caleta Olivia | 94 |
| Gob. Chabut, CR. 023 | 5,969 | Patagoniano | Caleta Olivia | 29 |
| Gob. Chabut, CR. 035 | 6,186 | Patagoniano | Caleta Olivia | (*) |
| Prov. Mendoza, Barancas 321 | 8,111 | Nogotes | Brecha Verde | (†) |
| Plaza Huincul, Challaco NA. 34 | 3,571 | Dinosaur Beds | Coloviano | 27 |
| Plaza Huincul, Challaco NA. 96 | 4,136 | Dinosaur Beds | Coloviano | 31 |
| Plaza Huincul, Challaco NA. 14 | 4,267 | Dinosaur Beds | Coloviano | Dry |
| Plaza Huincul, Senillosa NS. 6 | 5,972 | Dinosaur Beds | Coloviano | Dry |
| Plaza Huincul, Pampa Tril NPT. 1 | 3,749 | Neocomiano | Coloviano | Dry |
| Salta, Solazuit S. 4 | 3,035 | Third Sub-Andian | Third Sub-Andian | Dry |

*Initial production of 2,011,530 cu. ft. of gas per day through 2-in. choke with casing pressure of 1,911 psi. †Listed as an oil producer but initial rate not determined.

## Oil and Gas Development

| Field and company— | Discovery year | Area proved, acres | Total oil production (thou. of bbl.) To end 1947 | Total oil production (thou. of bbl.) During 1947 | Gas production (million cu. ft.) To end 1947 | Gas production (million cu. ft.) During 1947 | Number of wells: Completed To end 1947 | Completed During 1947 | Production at end 1947: Flowing | Production at end 1947: Artificial lift | Production at end 1947: Gas |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **COMODORO RIVADAVIA** | | | | | | | | | | | |
| Costa, Y.P.F. | 1907 | 8,443 | 99,018 | 2,586 | ..... | 3,936 | 1,837 | 7 | .... | 1,350 | 5 |
| Costa, Ferrocarriles* | 1907 | .... | 24,586 | 668 | ..... | ..... | ..... | .... | .... | .... | .... |
| Total Costa | | | 123,604 | 3,236 | | | | | | | |
| Escalante, Y.P.F. | 1924 | 6,565 | 46,841 | 3,142 | ..... | 3,912 | 741 | 30 | .... | 568 | 4 |
| Escalante, Diadema† | 1925 | .... | 63,684 | 3,927 | 34,907 | 1,191 | 495 | 29 | .... | 392 | 11 |
| Total Escalante | | | 110,525 | 7,069 | | | | | | | |
| Astra, Y.P.F. | 1916 | 64 | 130 | 21 | 11,511 | 2 | 15 | 2 | .... | 5 | .... |
| Astra, Astra | .... | .... | 24,135 | 860 | ..... | ..... | ..... | .... | .... | .... | .... |
| Astra, Ferrocarriles* | .... | .... | 12,293 | 335 | ..... | ..... | ..... | .... | .... | .... | .... |
| Total Astra | | | 36,558 | 1,216 | | | | | | | |
| Campo Sud, Y.P.F. | 1920 | 360 | 2,087 | 312 | ..... | 142 | 62 | 5 | 7 | 18 | 2 |
| Caleta Olivia, Y.P.F. | 1944 | 259 | 893 | 759 | ..... | 401 | 37 | 10 | 11 | 4 | .... |
| El Trebol, Y.P.F. | 1935 | 5,478 | 27,069 | 3,106 | ..... | 776 | 484 | 12 | 2 | 270 | .... |
| Total Comodoro Rivadavia | | | 300,736 | 15,698 | | | | | | | |
| **NEUQUEN** | | | | | | | | | | | |
| Central Octagon, Y.P.F. | 1918 | 74 | 1,801 | 2 | ..... | 3 | 110 | .... | .... | 27 | .... |
| West Octagon, Y.P.F. | 1923 | 971 | 5,013 | 230 | ..... | 387 | 166 | 7 | 5 | 88 | 1 |
| North Octagon, Y.P.F. | .... | .... | ..... | ..... | ..... | 742 | ..... | .... | .... | .... | .... |
| Total Octagon | | | 6,814 | 232 | | | | | | | |
| Laguna Colorado, Y.P.F. | 1924 | 200 | 3,078 | 38 | ..... | 98 | 89 | .... | 5 | 35 | 3 |
| Dadin, S.O.A. | 1924 | 324 | 7,948 | 105 | 5,801 | 89 | 107 | 1 | .... | 39 | .... |
| Total Dadin | | | 524 | 11,026 | | | | | | | |
| Challaco, Y.P.F. | 1941 | 1,559 | 8,272 | 1,756 | ..... | 143 | 99 | 18 | 8 | 75 | .... |
| Huincul, S.O.A. | 1923 | 2,157 | 4,494 | 191 | 21,394 | 867 | 87 | 1 | 4 | 47 | .... |
| Total Nuequen | | | 30,606 | 2,322 | | | | | | | |
| **MENDOZA** | | | | | | | | | | | |
| Cachueta, Y.P.F. | 1887 | 298 | 613 | 0 | ..... | ..... | 45 | .... | 1 | 25 | .... |
| Tupungato, Y.P.F. | 1934 | 1,055 | 17,102 | 1,224 | ..... | 332 | 34 | .... | 4 | 26 | .... |
| Lunlunta, Y.P.F. | 1939 | 217 | 28,252 | 349 | ..... | 29 | 12 | .... | 2 | 9 | .... |
| Barrancas | 1940 | 637 | 5,659 | 1,274 | ..... | 126 | 23 | 4 | 23 | .... | .... |
| El Sosneado, Ria Ateul | 1908 | 30 | 373 | 9 | ..... | ..... | ..... | .... | .... | .... | .... |
| Total Mendoza | | | 51,999 | 2,856 | | | | | | | |
| **SALTA** | | | | | | | | | | | |
| Zona Tartagal (Tranquitas), Y.P.F. | 1927 | 783 | 5,430 | 306 | ..... | 281 | 180 | 3 | 2 | 95 | .... |
| Rio Pescado, Y.P.F. | 1933 | 274 | 3,045 | 165 | ..... | 589 | 36 | 1 | 4 | 22 | .... |
| Agua Blanca, S.O.A. | 1926 | 49 | 1,279 | 29 | ..... | ..... | 8 | .... | .... | 2 | .... |
| Cerro Tartagal, S.O.A. | 1927 | 40 | 94 | 12 | ..... | ..... | 6 | .... | .... | 2 | .... |
| Lomitas, S.O.A. | 1927 | 576 | 3,355 | 81 | 4,692 | 89 | 93 | 1 | .... | 31 | .... |
| Ramos, S.O.A. | 1928 | 30 | 65 | 7 | ..... | ..... | 10 | .... | .... | 2 | .... |
| San Pedro, S.O.A. | 1928 | 494 | 14,196 | 365 | 16,402 | 773 | 58 | .... | 1 | 18 | .... |
| Total Salta | | | 27,464 | 965 | | | | | | | |
| Total Argentina | | | 410,805 | 21,841 | | | | | | | |

*Ferrocarriles production arbitrarily divided two-thirds from Costa and one-third from Escalante.

tion of 2,200 bbl. daily compares with 2,466 bbl. daily in 1946. Drilling activities of other companies are not readily available.

Argentina's 1947 total daily crude oil production of 59,800 bbl. compares with a daily output of 56,900 bbl. for 1946 and 62,700 bbl. daily in 1945.

As the Argentine Government has arranged to buy out the British Railway interests in that country, it appears likely that Y.P.F. will take over the operations of Cia. Ferrocarrilera de Petroleo which was owned by three railroad interests. Cia. Ferrocarrilera is the third largest oil-producing company in Argentina and was organized to supply fuel oil and lubricants for Argentina's railways.

International

**TABLE 2—DEVELOPMENT DRILLING BY Y.P.F. IN 1947**

| | Comodoro Rivadavia | Plaza Huincul | Mendoza | Salta | Total |
|---|---|---|---|---|---|
| Producing field wells, productive | 53 | 19 | 3 | 4 | 79 |
| Producing field wells, dry | 1 | 1 | .. | .. | 2 |
| Producing deeper tests, productive | 11 | .. | 1 | 3 | 15 |
| Producing deeper tests, dry | 1 | .. | 1 | .. | 2 |
| Step-out wells, productive | 8 | 1 | .. | .. | 9 |
| Step-out wells, dry | .. | .. | .. | .. | .. |
| Gas tests, productive | 1 | 1 | .. | .. | 2 |
| Gas tests, dry | 1 | .. | .. | .. | 1 |
| Totals | 76 | 22 | 5 | 7 | 110 |

## Development in Argentina

| Reservoir pressure, psi. | | Character of oil | | Producing formation | | | | | Deepest zone tested to end 1947 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Initial | Average end 1947 | Gravity A.P.I. | Sulfur, per cent | Name and age | Character | Porosity, per cent | Depth to top of prod. zone (ft.) | Productive thickness, av. ft. net | Name | Depth of hole (ft.) |
| | | | | **COMODORO RIVADAVIA** | | | | | | |
| 705 | .... | 18.9 | 0.17 | Chubut, Cre. M. | S | 30 | 1,640 | 98 | Tobifera Series | 7,750 |
| .... | .... | ... | ... | Chubut, Cre. M. | .. | .. | .. | ... | ..... | .... |
| 485 | .... | 23.7 | 0.12 | Chubut, Cre. M. | S | 25 | 3,772 | 65 | Horizonte T. 63 | 5,772 |
| .... | .... | 23.7 | ... | ..... | .. | .. | .... | ... | ..... | .... |
| 455 | .... | 21.5 | 0.14 | Chubut, Cre. M. | S | 30 | 1,804 | 16 | Horizonte Pampa | 4,592 |
| .... | .... | ... | ... | Chubut, Cre. M. | .. | .. | .... | ... | ..... | .... |
| .... | .... | ... | ... | Chubut, Cre. M. | .. | .. | .... | ... | ..... | .... |
| 882 | .... | 26.4 | 0.10 | Chubut, Cre. M. | S | 25 | 1,804 | 65 | Tobifera Series | 5,930 |
| 2,352 | 115 | 30.8 | 0.12 | Chubut, Cre. M. | S | 25 | 4,100 | 164 | C. Olivia Zone | 6,642 |
| 1,617 | 50 | 24.7 | 0.15 | Chubut, Cre. M. | S | 25 | 4,264 | 65 | Trebol Zone E-12 | 7,052 |
| | | | | **NEUQUEN** | | | | | | |
| 911 | .... | 32.8 | 0.2 | Lotena, Jur. M. | S | 22 | 1,869 | 32 | Baguales Series | 3,329 |
| 1,176 | .... | 30.6 | 0.2 | Lotena, Jur. M. | S | 19 | 2,263 | 49 | Baguales Series | 4,100 |
| .... | .... | ... | ... | Lotena, Jur. M. | .. | .. | .... | ... | ..... | .... |
| 1,617 | 75 | 33.4 | 0.2 | Lotena, Jur. M. | S | 20 | 1,804 | 32 | Baguales Series | 3,608 |
| .... | .... | 35.5 | ... | Lotena, Jur. M. | Cg | .. | 2,240 | 300 | Lias | 7,713 |
| 1,470 | .... | 22.3 | 1.9 | Lotena, Jud. M. | S | 25 | 3,280 | 75 | Baguales Series | 4,605 |
| .... | .... | 35.5 | ... | Lotena, Jur. M. | Cg | .. | 2,360 | 200 | Lias | 5,547 |
| | | | | **MENDOZA** | | | | | | |
| .... | .... | 30.0 | 0.1 | Rhaetic, Tri. U. | S | .. | 2,952 | 13 | Volcanic Series | 4,264 |
| 3,234 | 160 | 33.4 | 0.1 | Rhaetic, Tri. U. | Sh | .. | 6,888 | ... | Potrerillos Strata | 9,311 |
| 3,675 | 180 | 18.2 | 0.3 | Rhaetic, Tri. U. | S | 22 | 7,544 | 98 | Verde Breccia | 7,790 |
| 4,498 | 200 | 18.2 | 0.3 | Rhaetic, Tri. U. | S | 30 | 7,216 | 98 | Verde Breccia | 7,544 |
| .... | .... | ... | ... | ..... | .. | .. | .... | ... | ..... | .... |
| | | | | **SALTA** | | | | | | |
| 808 | 21 | 43.4 | 0.1 | Gondwana, Per-Tri. | S | 15 | 4,920 | 32 | Gondwana-Abigar | 6,724 |
| 1,911 | 43 | 49.4 | 0.1 | Gondwana, Per-Tri. | S | 18 | 4,100 | 49 | 3rd-Sub Andian Zone | 6,953 |
| .... | .... | 22.5 | ... | Tarija, Per-Carbon. | Tillite | .. | 2,215 | 574 | Devonian | 4,007 |
| .... | .... | 45.0 | ... | Tupambi, Per-Carbon. | S | .. | 2,428 | 300 | Devonian | 4,830 |
| .... | .... | 42.6 | ... | Tarija, Per-Carbon. | Tillite | .. | 1,000 | 1,625 | Devonian | 5,586 |
| .... | .... | 53.6 | ... | Devonian | Sh & S | .. | 3,085 | 360 | Devonian | 5,348 |
| .... | .... | 31.0<br>35.0<br>44.0 | ... | Tarija A & B<br>Tubambi C, Per-Carbon. | Tillite<br>& S | .. | A1,560<br>B2,500<br>C2,800 | 310 | Devonian | 5,233 |

†This field also produced 4,000 bbl. of condensate in 1947.

# Shell's New British Laboratory Plans Extensive Fuel Research

THE new Shell research center at Thornton-le-Moors, Cheshire, England, was opened formally on May 20 with an address by G. Legh-Jones, managing director of the Shell group of companies. This laboratory is located 7 miles from Chester, near Shell's largest British refinery at Stanlow.

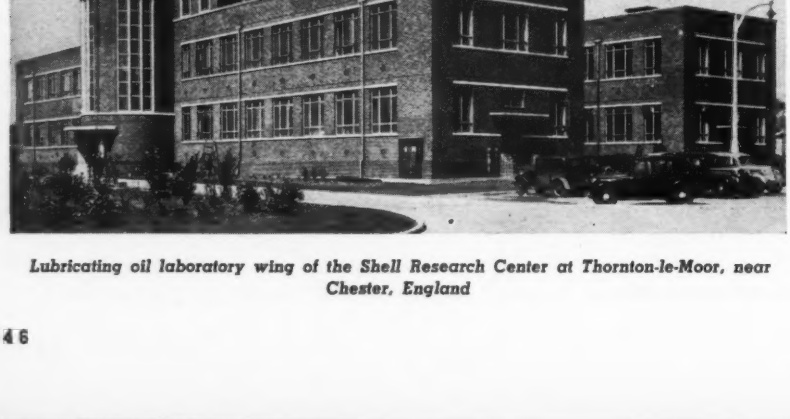
The new plant includes a plot of 30 acres, with buildings totaling 730,000 sq. ft. of floor space. The staff includes the research director and 323 qualified technical men, with 572 aides and assistants, mechanics, technicians, and clerical employes. In addition to numerous assemblies of equipment and apparatus for small-scale work, 78 test engines are housed in the various sections of the laboratory.

The laboratory will give close attention to the field of aviation engines, fuels, and allied phases of research. Attention is turning more and more from piston engines to the jet and gas-turbine types of power plants; however, considerable attention is being given at present to improvement of reciprocating-engine performance using conventional-type fuels. Development of test methods for evaluating gas-turbine fuels is being pushed intensively. To reduce or prevent exhaust valve corrosion a metallic coating has been developed which gives considerable promise, it is claimed.

Diesel fuel development is receiving a great deal of attention also. Use of heavy fuels of higher viscosities is being studied for compression-ignition engine service. Study of sulfur content of diesel fuels and its effect on cylinder and ring wear, with a view to reduction of such wear, is being prosecuted aggressively. Further to improve lubrication and reduce cylinder wear, various types of porous platings are being investigated; one such coating is reported to show excellent promise for this purpose.

Production of better fuels and more efficient engines to use them is one of the main purposes of the laboratory management's policy. Increase in power output and reduction in fuel consumption are two of the important goals of the research work. One immediate and important problem being investigated is that of obtaining more even distribution of tetraethyl lead in the fuel between the individual cylinders of a multi-cylinder engine, thus improving the efficiency of both fuel and engine and giving better utilization of inherent antiknock quality in fuels.

Attending the ceremonies and taking part in them, Gen. James Doolittle, head of Shell's aviation activities in the United States, expressed his great appreciation for the invitation to be present and emphasized strongly the all-important role of the petroleum industry.



*Lubricating oil laboratory wing of the Shell Research Center at Thornton-le-Moor, near Chester, England*

## Geologist Reports Brazil Is One-Third Sedimentary

HOUSTON.—Approximately 1,187,000 sq. miles, or about 36 per cent, of the total area of Brazil are sedimentary basins of interest in petroleum exploration, Earle F. Taylor, Dallas, told the Houston Geological Society, May 24.

Average thickness of the sediments in these areas is about 5,500 ft., he said. There are 10 separate basins with all of the country's oil production at present in the Bahia Graben.

Taylor, now with DeGolyer & McNaughton, formerly was associated with the National Petroleum Council of Brazil which has charge of the country's oil development.

The Bahia Graben consists of 14,460 sq. miles, but present oil production is concentrated in the Reconcava area where there are six fields, four of them of importance.

Total production averages about 3,000 bbl. daily, and, Taylor said, this will increase substantially as more wells are drilled. Daily production varies considerably at present, but a refinery is planned for construction in the area.

## International

## Philippines Still Closed To Private Oil Firms

No decision has been reached by the Philippine Oil Commission as to whether private concerns will be permitted to participate in the search for crude oil there. One report states that four foreign firms and one local company have submitted proposals to explore and drill in the islands.

At present Far East Oil Development Co. is the only private concern permitted by the Philippine Government to explore and drill there. This company, which is controlled by Andres Soriano, has leases at Daonbantayan on Cebu, and on the Bondoc Peninsula. Before resuming test drilling on Cebu, the company reportedly plans to carry out some geophysical work there.

## Anglo-Iranian Production Much Above 1947 Rate

Anglo-Iranian Oil Co., Ltd.'s crude-oil production for the month of March totaled 1,803,000 tons, or approximately 450,000 bbl. daily. This compares with February's total output of 1,619,000 tons or approximately 433,600 bbl. daily.

Production in Iran for the period January 1 through March 31 was 5,152,000 tons or 434,000 bbl. daily. This compares with the same 1947 period when the output totaled 4,448,000 tons or 380,500 bbl. daily. These figures were released from the office by B. R. Jackson, Anglo-Iranian's United States representative.

## Spanish Wildcat Dry

Cia. de Investigaciones y Exploraciones Petroliferas, S.A., plans to abandon its wildcat which was down to 7,622 ft. on the Oliana structure in Spain's Lerida Province (Catalonia). The rig may be moved to Burgo de Osma in the Province of Soria.

# WASHINGTON WATCHING

BY BERTRAM F. LINZ

## No Pipe

WASHINGTON.—While the steel industry probably will be able to fill all requirements for oil-country tubular goods called for in the National Petroleum Council committee estimates, there isn't a ghost of a chance of its producing all the line pipe needed by the oil and natural-gas industries.

Clifford A. Hahn, head of the petroleum division of the Office of Industry Cooperation, agrees with spokesmen of the steel industry who say that less than half of the estimated 3,800,000 tons of pipe required can be produced.

The line-pipe situation is the toughest of a number of tough ones involved in the allocation agreement which is being worked out. Here, in brief, is how it sums up:

1. The pipe manufacturers are practically full booked on firm contracts for the next 4 or 5 years, and operating mills are working at capacity and there is only a little additional production which could be secured by converting other facilities to the manufacture of pipe.

2. The steel industry is reluctant to build new plants because (1) it would require 18 months to 2 years, (2) would take large quantities of steel and (3) once the present shortage is overcome much of the additional capacity would become surplus, with consequent loss of investment values.

3. The greatest deficiency will be in large-diameter pipe, 14 in. and upward. The pipe requires plates, which also are in short supply and expected to be shorter when ship-building and rearmament programs get under way. More plate might be produced at the expense of sheet, but that would run into automobile production, more sorely needed each year because of the advancing age of millions of prewar cars which literally are on their last tires.

Just to make matters worse, steel men assert positively that if their present production rate is maintained through the summer without a marked increase in scrap supplies, output is bound to fall off badly before the end of the year.

Officials in Washington see no way by which the Government can force an increase in output. There is no authority for them to interfere with the contractual arrangements made by the mills, and while the allocation authority which President Truman has vainly tried to get Congress to grant would permit control of the uses to which steel might be put it wouldn't add a ton to the supply.

## Mexican Stimulant

SEN. KENNETH S. WHERRY of Nebraska, who has come up with a number of suggestions for legislative and governmental action on oil and steel as a result of his investigations as chairman of the Small Business oil subcommittee, is about to tackle the problem of boosting Mexican development.

Some weeks ago, the senator held a hearing at which the Mexican situation was explored, at which it developed that American companies whose properties were expropriated by the Mexican Government a decade ago won't consider returning to Mexico unless they are given more than the government is willing to grant in the way of a free hand in operations and assurance their equities will be protected, while independent entrepreneurs who want to take development contracts are handicapped by lack of funds or materials.

To deal with some of those handicaps, Wherry may introduce legislation authorizing the Reconstruction Finance Corp. to make loans to American operators on the security of Pemex bonds which are being offered as part payment on drilling and development contracts. Bonds guaranteed by the Mexican Government, he believes, would be better than the collateral on which the RFC based some of its wartime loans.

If the legislation is actually introduced this month, there is little likelihood that Congress will act upon it this year, although it will attract considerable support from members who have been convinced that our best bet for supplementing our domestic oil supplies is in Mexico rather than the Middle East.

## Tariff Tinkering

HOUSE Republicans last week wrote the Reciprocal Trade Agreements Act which they said should have been passed in the first place, but which the Administration says is worse than no law at all.

They embodied their changes in a bill extending the act for one year, after rejecting a request from President Truman for a 3-year extension without modification.

The bill eliminates the Committee for Reciprocity Information, composed of representatives of a number of departments who, industry has charged, have been dominated by the State Department members, and provides that hearings on proposed agreements shall be held by the Tariff Commission alone.

The commission would make its report direct to the President for consideration in connection with the agreement negotiated by the State Department. If the final agreement provides for rates within the competitive area found by the Tariff Commission, it can be put into effect by the President, but if the commission's report is not followed he may not proclaim the new rates until Congress has had 60 days in which to object by concurrent resolution which would kill the treaty.

Right now the question of import taxes isn't too important to oil men since the market can absorb a lot of foreign oil without getting indigestion, but before the war a lot of them felt their case wasn't getting a fair break before the Committee for Reciprocity Information, even though imports were limited and a quota system set up.

Administration officials charge that the determination of minimum tariff rates would be vested in the Tariff Commission, which would be required to consider only the interest of domestic producers, without regard for the interests of industry, labor, farmers, and consumers nor our financial and foreign policy, and intimate the Republicans are paving the way for the imposition of tariffs 50 per cent higher than those in effect when the original act was adopted.

The Republicans, however, point out that new legislation will be necessary next year if the charter for the International Trade Organization is approved and it isn't likely any new trade agreements will be negotiated before then. The extension bill would not affect any agreements entered into heretofore.

## Monopoly Road Show

THE House small business committee, mostly inactive during the session of Congress, is planning to stage a 25-city road show during the pleasant days of next fall.

The occasion will be a nation-wide study and investigation of monopolistic practices and other unfair methods of competition—"a project that has already received the full support of more than 1,000,000 independent businessmen," in the words of Commit-

tee Chairman Walter C. Ploeser of Missouri.

Ploeser announced his investigation a couple of weeks ago, and since has received letters of support from a considerable list of organizations, more than half of those he listed being gasoline dealers' associations. Assured of an audience, he plans extensive hearings in about 25 cities, to be selected on the basis of returns to questionnaires which have been sent to businessmen, asking them to outline their competitive problems, and particularly their main objections to the present antitrust laws.

"In spite of the existence of antitrust laws and the power of the Federal Trade Commission to define and prohibit unfair methods of competition, such practices appear to be flourishing on a wide scale in the nation's economy," Ploeser said.

The present laws need a thorough overhauling, and the committee will find what is needed to make them serve their original purpose, he said.

### Ball Out

MAX BALL, Oil and Gas Division director, has told Interior Secretary J. A. Krug that he definitely wants out by August 1, and is telling his friends that if Krug doesn't succeed in snaring a new director by that time there's going to be a hole in the government establishment.

Ball took the job "for a few months" in December 1946, and for the past year has been trying to shake his feet loose. Last fall, when the supply situation began to get really black, he agreed to see it through; now, with the industry's voluntary agreement and its steel program practically wrapped up, he wants to quit as soon as possible after the National Petroleum Council meeting next month.

A number of men are reported to have been approached to take over the many headaches of Ball's job at the modest honorarium which the Government offers for the best brains in industry, in this case $10,000 a year.

These are a number of men in the industry who would do well in the job and would take it, as many took posts in PAW, under the stress of war, but there are few who would be willing to make the financial sacrifice in time of peace. But Ball has done it for 18 months, and he thinks somebody else should take a turn now.

### Seagoing Indians

CALIFORNIA oil men can breathe easily again—the Supreme Court has decided not to give the state back to the Indians.

Sometime ago, Norman M. Littell, former assistant attorney general who attempted to take an active part in the Government's tidelands suit, filed a petition with the court contending that the highly valuable submerged oil lands really belonged to the Indians who fished over them long before the white man came along.

Last month the court rejected Littell's petition, and he now is preparing to file papers with the Interior Department to represent the Indians before the Indian Claims Commission, where they plan to prosecute their claim. Under the Indian Claims Commission law, an attorney seeking to represent Indians must have a legal contract with them, approved by the secretary of the interior.

Meanwhile, the Indians charge the palefaces are seeking to deprive them even of their right to petition the tribunal set up for their protection. Legislation pending in the Senate, they say, would provide that only the attorney general of California could bring claims against the Government before the commission.

The bill was introduced by Sen. Hugh Butler of Nebraska, who said he thought highly of Littell and is trying only to clean up a mess where some 28,000 lawyers are trying to represent 23,000 Indians.

But the Indians say the Butler bill was amended in committee to make the state attorney general their mouthpiece because the state is afraid of their valid legal claims to the tidelands. And if the bill goes through, which isn't likely this session, they say they won't play ball because they know they won't get even to first base.

### Scrap Scrap

BRITAIN has taken more than 500,000 tons of scrap iron and steel out of Germany while the United States has received only 7,000 tons, although Department of Commerce officials say if we could get a sizable part of the up to 10 million tons available in the United States, British, and French zones, domestic steel production could be upped possibly as much as 5 million tons, which would go far to relieve the shortage.

Although Washington officials have been unable to develop any program for bringing scrap to this country, they have permitted some 200,000 tons to be shipped to Italy, and the Italian Government now is dickering for more.

Officials admitted that Britain apparently has solved problems which they say are impeding the development of plans to gather up German scrap. The English interpretation of "booty" scrap, they said, is broader than our own and includes semifabricated steel which they found in factories as well as armament captured as the Allies overran the country.

"Rubble" scrap is considered by the American occupation authorities as belonging to the owners of the bombed properties. The identity of those owners is frequently in doubt, hindering purchase of the scrap, but it is admitted that payment for the material could be put into a fund held by the occupation authorities until the question of ownership was decided.

Officials in Washington are quick to defend their failure to bring scrap here in large volume by pointing out the many "factors," "problems," and "difficulties" involved, but it all adds up to a pretty poor showing of America's much-vaunted efficiency.

The basic difficulty seems to be that when Britain makes a policy it is done by a few men who know what they want, while Washington does it only after interminable wrangling by "interdepartmental" committees whose interests and objectives often conflict, as may be visualized from the makeup of one such committee, which is headed by a scrap consultant from the Office of Industry Control and includes representatives of the Army, Navy, State, and Commerce Departments, the National Resources Planning Board, the War Assets Administration, and the Maritime Commission.

## Payne and Mapes Predict Oil Needs Will Be Met

William T. Payne, president of the Big Chief Drilling Co. and Clarel B. Mapes, managing director of the Mid-Continent Oil and Gas Association, discussed the present oil supply situation in a broadcast of the National Broadcasting Co. May 30 in which approximately 200 stations throughout the country participated. The broadcast was one of NBC's weekly series entitled "America United" and was under the sponsorship of American Farm Bureau Federation. John J. Lacey, director of information for the farm bureau, presided as moderator. John I. Taylor, president of the Oklahoma Farm Bureau Federation, also participated.

Payne and Mapes predicted that the oil industry would be able to supply this year's oil requirements and urged consumer cooperation in economic utilization and adequate storage. Payne is president of the Oklahoma-Kansas division of the Mid-Continent Oil and Gas Association and head of the oil industry's public relations program in Oklahoma. Copies of the broadcast are obtainable from the farm bureau headquarters at Chicago.

## Spectrometer Donated

AUSTIN. — A mass spectrometer valued at $10,000 has been given to the University of Texas by Humble Oil & Refining Co.'s Research and Development division. The instrument will be a valuable aid in certain types of research work, said University President T. S. Painter.

# Congress Finds No Solution for Oil Industry's Steel Problems

***by Bertram F. Linz***

WASHINGTON.—Two congressional committees dug into the question of steel supplies last week but after long hours of hearings had no solution for the problems of the oil industry.

On the House side of the Capitol, the Interstate Commerce Committee was told by steel industry spokesmen that while it appears likely that 1948 requirements for oil-country tubular goods can be met in full there is nothing to indicate that more than half of the line pipe needed will be forthcoming.

Chairman Charles A. Wolverton of New Jersey thereupon called Thomas C. Blaisdell, Jr., acting assistant secretary of commerce, to explain the system followed in setting up oil-pipe export quotas. Wolverton asked a number of embarrassing questions concerning the export situation, but asked them all at one time and Blaisdell never got around to answering them seriatim.

Blaisdell testified that the "screening" of foreign oil projects in connection with first-quarter quotas resulted in about 57 per cent of the licensed oil-country goods going to Latin America. The remainder was scheduled mostly to go to the Middle East, he said, but for the current quarter the amounts licensed for that area were sharply reduced.

### Trading Steel for Oil

The main criterion used by the department in this connection appears to be the increase in output that the material will provide, Blaisdell indicated, pointing out that while a ton of steel will on the average increase oil production by about 100 bbl. a year, "that same ton of casing will produce about 1,000 bbl. a year if used in Venezuela and more than 6,000 bbl. if it is sent to the Middle East."

Meanwhile, in an analysis of the testimony of steel-industry representatives prepared for submission to the committee by Russell B. Brown, general counsel of the Independent Petroleum Association of America and chairman of the National Petroleum Council committee on industry steel requirements, it was pointed out that if the expected 1,600,000 tons of oil-country goods is produced this year it will represent an increase of 45 per cent over the 1946 output, "indicating real progress by the steel industry toward overcoming the critical shortages that exist in the supply of materials for the drilling and completion of oil and gas wells."

If such a supply of tubular goods is made available to the domestic industry, Brown said, the goal of meeting a total demand for 6,250,000 bbl. daily this year and 6,550,000 bbl. daily in 1949 will be met but, he added, there are several unknown factors that cannot now be evaluated.

One of these factors is the volume of materials to be furnished to foreign nationals, either under the European recovery program or in countries not participating in that program such as Latin America and Canada.

### Goal May Rise

Further, he told the committee, "there is some evidence that the consumption of petroleum may exceed the goal that was set at the time the National Petroleum Council's committee prepared its estimate of steel requirements" which, if it occurs, will increase the needs for materials.

The inability of the steel industry to provide the required volume of line pipe will make necessary the use of alternative methods of transportation. Delay in providing pipe for the completion of projects now scheduled will handicap to an increasing extent in the future the efforts to provide for the rising trend of oil demands, and the effects will be felt more seriously in the years ahead than in the immediate period, Brown said.

Brown pointed out, also, that the trend toward larger-diameter pipe lines is not a temporary condition but a definite change in practice giving rise to new demands which, he said, must be provided for through a long-range program of expanded facilities.

On the other side of the Capitol, the oil and steel groups of the Senate small business committee held a 3-day hearing at which they heard, first, representatives of steel consumers including oil operators, then spokesmen for the governor of a half-dozen states and, finally, a round dozen steel-company officials.

Describing conditions which Chairman Kenneth S. Wherry of Nebraska said prevailed generally, J. N. Thelen of Great Falls, Mont., representing a group of independent producers, said that as a result of shortages operators must do one of two things—either slow down development of their leases or abandon small stripper wells to salvage casing.

The major companies may be cut by the same percentage as the small operators, Thelen said, but they can place orders of such size that the cut will not affect them, while the small independent cannot afford to obligate himself for more pipe than he actually can use.

Thelen charged that some major companies and pipe suppliers are offering materials to small operators in return for payment of the market price "plus some other considerations" such as a contract for sale to the supplier of the crude produced with the material. He said the share of the independents in Montana operations since 1940 has declined from 79 per cent of the wells and 78 per cent of the production to 55 and 40 per cent, respectively.

The need for greater supplies of tubular goods in the producing area was described by officials from Kansas, Minnesota, Texas, Oklahoma, and North and South Dakota, and when the steel manufacturers followed them Wherry declared that the views of the state officials had been backed up by the 1,500 complaints his committee has received from oil producers and other steel consumers of inability to secure needed supplies.

Wherry told the steel men that if they didn't work out a voluntary program that would get steel to the users and areas where it is needed they would have to face demands for government controls to which he is opposed. He sought to have the steel industry adopt a program similar to that worked out by the committee last year with oil companies, under which special attention would be paid to hardship cases and an effort made to provide supplies for all customers.

### Tubular Goods Promised

Earlier the House committee was told by representatives of steel producers that the requirements for oil-industry tubular goods as estimated by the NPC committee can be met in full, barring interruptions in steel production, but that requirements for line pipe definitely cannot.

The testimony of Jay W. Owings, manager of oil-country tubular sales for Youngstown Sheet & Tube Co., and W. F. McConnor, vice president of National Tube Co., was the first definite statement of the steel industry's ability to meet oil-industry requirements.

Owings told the committee that the steel industry in general has increased its production by approximately the same percentage as the increase in footage drilled, and that it expects

to maintain the same relative increase during the next year.

"On the assumption that this year will see no further reductions in steel production and that the first half of next year will likewise be free of work stoppages," he said, "we may assume a production rate of 1,600,000 tons for the four quarters in question. Although a comparison of the 1,600,000-ton production figure with the 1,677,210-ton requirement figure indicates a small percentage deficit, there is no doubt that this deficit can be made up through uninterrupted operations.

"My conclusion is that there will be oil-country tubular goods in sufficient quantities to meet the petroleum and gas requirement during 1948 and 1949 unless the tube mills are called upon to furnish semifinished steel for overseas shipment, which could be done only at the expense of finished tubular goods. Furthermore, the balance indicated above can be upset if work stoppages occur, and if this happens the petroleum industry will suffer with all other users of steel."

### Line Pipe Hopeless

A less optimistic picture of the line-pipe situation was drawn by McConnor, who estimated that 2,000,000 tons of pipe production has been lost through fuel shortages, work stoppages, and other handicaps since V-J Day in August 1945.

McConnor pointed out that the 1947 output of line pipe was 239 per cent of the 1937-40 average, but said flatly "it is impossible for the pipe industry to meet the greatly increased demands in the time specified by the National Petroleum Council report." He estimated that it would take as much as 3 years or more to fill the requirements estimated by the council committee for the next 18 months.

Almost exactly half of the line-pipe estimate is for 16-in. or larger, and it has been indicated that the inability to produce will be most marked in those sizes. Some additional production will come from a Pacific Coast plant which went into operation last fall to produce 26 to 31-in. pipe, another to start operations at Gadsden, Ala., in July on 20 to 30-in., and a new mill producing 2 to 4-in. seamless pipe scheduled to be completed early next year.

McConnor warned the committee that pipe requirements for national defense may have some effect in increasing pipe demand, citing specifically a requirement of approximately 40,000 tons of pipe and tubing which the Atomic Energy Commission has set up for the next 8 months.

# Drilling Activity Offshore in Gulf Stepped Up by Several Companies

HOUSTON.—The tempo of drilling in the Gulf of Mexico is increasing rapidly, it is indicated in the announcements of new projects by several companies active in this area.

Stanolind Oil & Gas Co., Gulf Coast division, has filed application with the Army Engineers office in Galveston for permits authorizing two drilling operations in the Gulf off the Texas Coast.

One location is about 3 miles off shore and 4 miles south of High Island, Galveston County. Here Stanolind will construct a 45 by 93-ft. steel platform on eight 30-in. pipes and use a converted LST as a drilling-rig tender. Water depth is 30 ft. The second location is about ½ mile south of the axis of the Galveston South Jetty. Stanolind's platform here will measure 45 by 55 ft. supported on four 30-in. pipes. Water depth is about 46 ft. A portable rig will be used.

Stanolind also asked the Engineers Office for permission to conduct test pile driving operations about 10 miles southeast of San Luis Pass in the Gulf of Mexico. A 200-ft. pipe would be used in 48 ft. of water.

A blanket permit authorizing all construction necessary to oil development in 14 state tracts in the Gulf of Mexico has been asked by Tidelands Oil Corp. and Superior Oil Co. The two areas involved are central to a point about 3½ miles off shore and 22 miles northeast of Port O'Connor, Calhoun County. Water depth varies from 17 to 50 ft. Platforms will be 116 ft. long and from 40 to 50 ft. wide.

Drilling structures each consisting of two platforms, one for operating equipment and one for personnel quarters, were proposed by Ohio Oil Co., Houston, in asking a blanket Department of the Army permit covering Gulf of Mexico drilling.

Ohio Oil's application is for operations in an area of 2,880 acres central to a point about 5 miles off shore and 15 miles northeast of Freeport, Brazoria County, Texas. This is the south half of State Tract 248.

The company said the drilling structures would consist of a 90 by 185-ft. drilling platform connected by a steel foot-bridge 80 ft. from another platform 69 by 80 ft. to be used as living quarters. Pipe piles driven in braced templates will be used. Water depth in which the work will be carried out varies from 45 to 51 ft. Steel mooring and protective dolphins with top elevations of 14 ft. above mean Gulf level would be constructed around the structures.

Humble Oil & Refining Co., one of several oil companies now engaged in Gulf of Mexico drilling operations, has leased dock space in Orange, Tex., for berthing LSTs to be used in the work.

Humble has purchased 14 LSTs from the Maritime Commission in San Francisco and announced they will be berthed at Orange pending arrangements for their conversion and refitting. The converted tank landing ships are useful as work barges in drilling-platform construction and also as auxiliary crew and equipment vessels during drilling. Humble said the first of the vessels will arrive about the middle or latter part of July. Humble has one test drilling off the Louisiana coast and several other platforms in various stages of construction.

# Another Well Successful In Gulf Off Louisiana

HOUSTON.—A second oil discovery in the Gulf of Mexico off the Louisiana Coast is reported at Magnolia Petroleum Co. 1 Ship Shoal, Block 72, about 8 miles off Raccoon Point of Isle Derniere, Terrebonne Parish.

The well flowed at a rate of 288 bbl. daily after a 500-bbl. tank was barged to the location for a production test, according to reports here. A company announcement was that oil of about 45° gravity flowed from casing perforations at 6,885-88 ft. in sand logged at 6,884-6,900 ft.

Magnolia hit a salt dome at 8,290 ft., drilled into the salt to 9,355 ft., then tested shows. Two tests at 7,320-22 ft. and 7,268-73 ft. flowed dry gas.

First oil discovery in the current active drilling program in the Gulf of Mexico was Kerr-McGee's well about 11 miles off Pointe au Fer Island, Terrebonne Parish, which found production at about 1,700 ft. last November.

## Dr. Wilson Speaker at U. of Tulsa Commencement

"The ultimate success of the American hope of profit system depends upon the ability to maintain a fair and reasonable balance of incentives for labor, management and capital," Dr. R. E. Wilson, chairman of the board of the Standard Oil Co. (Indiana) told members of the graduating classes of the University of Tulsa, May 31. Dr. Wilson delivered the principal address speaking on the subject "Individuals and Incentives."

The honorary degree of Doctor of Humane Letters was conferred on Dr. Wilson at the graduating exercises.

# PERSONALS

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## J. C. Donnell II, Succeeds His Father as Ohio Head

J. C. DONNELL II, a vice president and in charge of crude-oil purchases and sales for Ohio Oil Co., has been named president of the company. A graduate of Princeton University in 1932 he has been with the organization since that time.

In 1936 he was elected to the board of directors and a year later was named vice president. In addition to his present position Donnell is president and director of Mountain Fuel Supply Co. and a director of the First National Bank of Findlay (Ohio).

He was elected to the board of directors of the American Petroleum Institute in 1945 and is affiliated with the Mid-Continent Oil and Gas Association, the American Gas Association, the National Petroleum Council, and the Independent Petroleum Association of America. He is a member of the advisory council of Princeton's geology department.

Donnell succeeds his father, O. D. Donnell, who has announced his retirement but will continue as director until October 1. Having served with the company since 1906 when he graduated from Case Institute of Technology in mechanical engineering, he became an official of the company when he was elected to the board of directors in 1910. In 1913 he was made vice president and in 1922 treasurer. He succeeded his father as president and general manager in 1927.

Among those elected to the Transportation Association of America board of directors recently were: **A. G. Anderson,** general traffic manager, Socony-Vacuum Oil Co., Inc., New York; **A. D. Carleton,** manager, traffic department, Standard Oil Co. of California, San Francisco; and **F. O. Prior,** vice president, Standard Oil Co. (Ind.), Chicago, Ill. Other members serving on the board and who are in the oil industry are **J. L. Burke,** executive vice president, Stanolind Pipe Line Co., Tulsa; and **Charles R. Musgrave,** vice president, Phillips Petroleum Co., Bartlesville, Okla.

**H. R. Sharkey,** geologist for Carter Oil Co., has been transferred from Lander to Buffalo, Wyo.

**John A. Mackintosh,** geologist formerly with The Texas Co., has joined Wil-Tex Oil Corp. Wil-Tex was recently purchased by Panhandle Producing & Refining Co. from **Sam E. Wilson, Jr.,** Corpus Christi independent.

**George W. Cupit, Jr.,** state fuel examiner for Oklahoma, has been elected chairman of the Mid-Continent section of the Society of Automotive Engineers for the 1948-49 period. **R. G. Hilligoss,** Bartlesville, Okla., was named vice chairman.

*E. E. McPHERSON*

**E. E. McPherson,** superintendent of the Pure Oil Co.'s Heath refinery at Newark, Ohio, since 1930, and associated with the company for 28 years, has been named manager of the refinery. He has served as still foreman, Cross still operator, and assistant superintendent. Prior to going with Pure McPherson was engaged in refinery operations with Empire Refineries, Inc., at Gainesville, Tex., and with Standard Oil Co. (Ind.), at Sugar Creek, Mo. **Dale G. Miller,** formerly assistant superintendent and who has been with the company for 17 years, has been named general superintendent. **Harry Hook,** with Pure for 25 years and **Ensel A. Hall,** with the company for 21 years, have been named superintendent of operations and superintendent of maintenance, respectively.

**C. D. Cantrell,** on the geological staff of the Phillips Petroleum Co.'s district office at Midland, Tex., has resigned to become associated with **H. J. Porter,** independent operator at Houston.

**R. W. Mallory,** who has been serving as district geologist at Amarillo, Tex., for Stanolind Oil & Gas Co., has been moved to the Rocky Mountain area, with headquarters at Denver.

**Harry B. Kniseley** has been appointed regional public relations manager for Carter Oil Co.'s Northwest division, with headquarters in Denver.

*R. C. BROWN*

**R. C. Brown,** assistant to the manager of Continental Oil Co.'s Rocky Mountain region of the production department, Denver, has been elected vice president, director, and manager of Hudson's Bay Oil & Gas Co., Ltd., a Continental subsidiary. He will make his headquarters in Calgary. Brown, who has been with Continental for 24 years, joined the company in Tulsa as a warehouse clerk. He served many years in the company's production accounting department, and in 1946 was made assistant to **J. C. Johnston,** Rocky Mountain production manager. **L. L. Aitken, Jr.,** who has been associated with Continental as an attorney in Denver for the past 10 years, has been appointed executive assistant to **W. H. Ferguson,** executive vice president of Continental.

**Chester J. Sandy,** senior chief chemist at Pittsburgh Works of Esso Standard Oil Co. of Pennsylvania, has retired.

**Norman B. Maxwell,** formerly secondary-recovery engineer for Cities Service Oil Co. in Bartlesville, has been sent to Mexico in connection with that company's Mexican operations.

**S. L. Digby,** attorney of Monroe, La., has been appointed director of the Louisiana oil and gas conservation commission to succeed **Joseph L. McHugh.**

**C. I. Wall,** vice president and assistant general manager for West Texas Gas Co., Lubbock, Tex., has been named vice president in charge of operations, with general supervision over the company's distributing plants, pipe lines, and compressor stations. **Herman F. Heath,** manager of the Midland, Tex., district, has been made superintendent of city plants at Lubbock, with direct supervision over 44 distributing plants.

# PERSONALS

**R. W. Lewis,** formerly manager of the Littlefield district, will replace Heath as manager of the Midland district.

**J. E. Drew,** formerly assistant director of promotion of the American Gas Association, has been named associate director of public relations of Lever Brothers Co.

**W. J. Gourley,** Fort Worth, Tex., oil operator and head of the W. S. Ranch Co., has purchased the Vermejo Park ranch near Raton, N. M., at a reported cost of $1,500,000.

**C. R. Wallace,** supervisor of field operations in the geophysical division of The Texas Co.'s producing department, has been promoted to assistant to the division manager. He graduated from the University of Missouri in 1928 in geology and in 1930 joined the faculty of Texas A. & M. College as instructor in geology. He joined The Texas Co. at Houston as an assistant computer in the geophysical division in 1934. Wallace was largely instrumental in initiating the company's own gravity-meter surveys. In 1943 he was made supervisor of field operations with headquarters in Houston.

**S. L. Slaughter,** drilling superintendent for Tropical Oil Co., returned to Bogota late in May after a short trip to New York, Tulsa and San Francisco.

**L. F. Wells,** geologist, Ogden, Utah, and **Frank Neighbors,** have joined the Sun Oil Co. staff in Salt Lake City.

**V. C. Bash** has been named to succeed **Arthur E. Barrus,** who has retired as secretary-treasurer of Sinclair Prairie Oil Co., Sinclair Wyoming Oil Co., and Repollo Oil Co., the three Sinclair producing companies operating out of Tulsa. Barrus joined Sinclair Oil & Gas Co. at the time Sinclair Oil Corp. was organized in 1916. Of his 42 years service in the oil industry, 35 of it has been with the Sinclair organization. **R. J. Jones** is assistant secretary-treasurer and **Arthur Hasty** was recently named assistant treasurer.

**J. A. Lentz,** western sales manager of Continental Oil Co., Denver, and **W. N. Finnegan, Jr.,** assistant to the president of Humble Oil & Refining Co., Houston, are newly elected members to the Oil Industry Information Committee.

**Carl Barker,** who joined Shell Oil Co., Inc., as an engineer at Ardmore, Okla., in 1916, and since 1940 has been located in the New York office, has been appointed special assistant to the president of Shell.

**Deloss A. Grant,** Chicago division credit manager for Socony-Vacuum Oil Co., Inc., has been elected treasurer of the Chicago Association of Credit Men. He was president of the American Petroleum Credit Association in 1944-45 and has been with Socony-Vacuum since 1925.

**E. W. Isom,** director of research and development, Sinclair Refining Co., has been awarded the Medal of Merit conferred by the Colorado School of Mines for "outstanding achievement."

**Thomas J. Hilliard,** sales vice president of Carnegie-Illinois Steel Corp., and formerly president successively of Carhile Petroleum Co., Pittsburgh Oil & Refining Co., and Waverly Oil Works Co., has resigned.

**L. M. Mauney,** chief chemist for Warren Petroleum Corp., manufacturing division, has been promoted

*L. M. MAUNEY*

*REX LANE*

to general superintendent of plant operations, and **Rex Lane,** process engineer for Warren, has been named chief engineer in charge of construction and maintenance. Mauney joined Warren when that corporation purchased the natural-gasoline division of Amerada Petroleum Co. In 1941 he was made chief chemist and has spent considerable time in developing special products production at several of Warren's plants. Lane joined the Warren organization as a process engineer in 1943, after several years of engineering experience in the natural-gasoline field. He first served on the engineering staff of Sinclair Prairie Oil & Gas Co. in 1928, and was assistant chief engineer at the time he resigned in July 1942 to become affiliated with Chemical Construction Corp., at Dumas, Tex. He joined the Warren organization a year later.

**E. W. Cook,** formerly senior landman for Stanolind Oil & Gas Co., in the Oklahoma City district, has been appointed district landman for the North Louisiana - Arkansas district, with headquarters in Shreveport.

*H. H. ARNOLD, JR.*

**Harry H. Arnold, Jr.,** assistant division manager of the Rocky Mountain division, producing department, for The Texas Co., has been made division manager. He succeeds **Hugh A. Stewart,** who is retiring after 25 years of service with the company. After graduating in 1927 from the University of Pennsylvania's School of Mines at Pittsburgh where he studied petroleum geology and engineering, Arnold joined The Texas Co. at Houston in the geophysical department. In 1938 he was named Oklahoma division geologist. In 1946 he was named general superintendent of the Illinois district and was later transferred to Tulsa as assistant manager, Oklahoma division. Early this year he was appointed assistant division manager, Rocky Mountain division, with headquarters at Denver.

**T. H. Harder,** formerly district superintendent of Salt Creek-Colorado district at Casper, Wyo., has been made assistant division production superintendent for Stanolind Oil & Gas Co. at Casper. Other Stanolind transfers and promotions include: **J. O. Fair,** assistant field superintendent of the Rangely, Colo., area, to field superintendent; **F. T. Chambers,** petroleum engineer in the Salt Creek area, Midwest, Wyo., to field engineer for that area; **G. C. White,** district engineer for the Salt Creek-Colorado district at Casper, to field superintendent of the Winkleman Dome area at Lander, Wyo.; **G. H. Reneau,** junior petroleum engineer at Rangely, Colo., to field engineer for the Elk Basin area, Elk Basin, Wyo.; **W. A. Van Hook, Jr.,** plant superintendent of the Luby natural gasoline plant, Robstown, Tex., to field superintendent of the Little Buffalo Basin area, Thermopolis, Wyo.; and **C. E. Johnson,** district superintendent, Big Horn-Lander district at Casper, to Cody, Wyo.

**Lot Bowen,** assistant to the vice president of Western Gulf Oil Co. in Los Angeles, has been elected chairman of the American Petroleum Institute's Pacific Coast District, division of production. Bowen, who succeeds **E. V. Watts** of General Petroleum Corp. as district chairman, was general chairman of the recent spring meeting.

**D. J. Gribbin, Jr.,** formerly Rocky Mountain oil representative for Union Pacific Railroad, has been appointed geologist with Trigood Oil Co. with headquarters at Casper, Wyo.

**P. R. Applegate,** formerly president of Buckeye Pipe Line Co., New York, has been elected chairman of the board of directors, and **J. H. Peper,** formerly vice president and chief engineer, has been named president to succeed Applegate. Other company changes include the following: **G. S. Patterson,** formerly vice president, to executive vice president; **H. K. Floyd,** formerly general manager, to vice president and general manager; and **A. J. Helmbrecht,** formerly assistant chief engineer, to chief engineer.

**Ray O. Armstrong,** Kilgore, Tex., has resigned as chairman of the federal petroleum board there.

**Charles J. Leroux,** director of Penn Grade Crude Oil Association and a member of the Lubricating Oil Marketing Committee of the American Petroleum Institute, has resigned as vice president in charge of sales for Freedom-Valvoline Oil Co. to establish a general brokerage in Cincinnati, Ohio.

**John Edahl,** acting geologist and assistant secretary of Chapman Oil Co., Mt. Pleasant, Mich., has resigned to enter private business.

**W. T. Hoey,** district geologist in West Texas for Plymouth Oil Co., has resigned to become a consulting geologist with offices in Midland, Tex.

**James S. Noland,** district landman in West Texas and Southeast New Mexico for Phillips Petroleum Co., has resigned to become an independent operator with headquarters in Midland, Tex.

**Everett L. Smith,** district petroleum engineer for the oil and gas division of the Railroad Commission of Texas in the Midland, Tex., office, has resigned to begin operation of the West Texas Oil Well Report and Engineering Service. He will maintain an office in Midland.

**Harold Moore,** formerly superintendent at the Pampa, Tex., compressor station for Cities Service Gas Co., has been assigned superintendent of the new Hugoton compressor station near Ulysses, Kans. He will be succeeded by **Henry Burrows,** who is being transferred from Ottawa, Kans. **Karl Mengerhausen,** who has been located at Petrolia, is being assigned to Ottawa as station superintendent. **George Arterburn** will become station superintendent at Petrolia.

**William L. Woolley,** recently resigned from Mid-Continent Petroleum Corp., has joined the Midland, Tex., office of Forest Oil Corp.

**Olen C. Allen,** formerly of Norman, Okla., has joined Faust & Kerns Development Co. as geologist.

**Glen C. Shaw** has moved from Casper, Wyo., to Oklahoma City and is operating as an independent.

**Wade Turnbull,** Michigan geologist for Carter Oil Co., has been named to the board of directors of the Oil and Gas Association of Michigan. He succeeds **Ed Branson,** who resigned recently to join Turner Petroleum Corp., Mt. Pleasant, Mich.

## SHIFTS—

**Charles Dugger,** landman, Gulf Oil Corp., Great Bend, Kans., to Oklahoma City; **Frank Earle,** geologist, Phillips Petroleum Co., Oklahoma City to Houston; **Albert C. Greer,** petroleum engineer, Anderson-Prichard Oil Corp., Hobbs, N. M., to Oklahoma City; **G. L. Hawkins,** superintendent for Skelly Oil Co., Guymon, to Seminole, Okla.; **Clyde Burton,** foreman, Skelly Oil Co., Seminole, Okla., to Kermit, Tex.

# DEATHS

**Norris G. Wood,** 60, retired executive of Standard-Vacuum Oil Co., died May 26 in Marlboro, N. H. During the war he was head of the New York office of the Petroleum Administration for War. From 1945 until 1948 he was adviser to the general management in Shanghai.

**W. Spencer Hutchinson,** 78, professor Emeritus of Mining and Metallurgical Engineering at the Massachusetts Institute of Technology and a former director of the A.I.M.E., died May 25 in Boston.

**Frank M. Schell,** 60, general superintendent of South Penn Oil Co., Bradford, Pa., died May 25 in Bradford. He had been with South Penn for 48 years.

**Ralph Eugene Hantzsch,** 50, superintendent of manufacturing for the Shell Oil Co., Inc., exploration and production research laboratory in Bellaire, near Houston, died May 27 in Houston.

**R. A. Brown, Sr.,** 63, whose Turner Valley Royalties 1 in 1936 opened the crude-oil production in the Turner Valley west flank, died recently in Calgary.

**Alvin Dean Nance,** 50, production foreman for Shell Oil Co., Inc., at Sweeny, Tex., died May 23 in Houston.

**Perry P. Lewis,** 64, engineer for The Texas Pipe Line Co., South Texas division, at East Houston prior to his retirement in 1945, died May 26 in Houston.

**Roy William McLeod,** 73, president of Armstrong & McLeod Co., Tulsa, and formerly field superintendent and foreman for The Texas Co. for 20 years, died May 31 in Tulsa. He was associated with Redbanks Oil Co. for 10 years.

**David L. Owsley,** 78, retired independent oil operator of Oklahoma and at one time secretary-treasurer for Wolverine Oil Co., died May 29 in Tulsa.

**Chester G. Peck,** 54, superintendent of the electro-chemicals department of the E. I. du Pont de Nemours & Co., Inc., plant in Perth Amboy, died May 22 in Metuchen, N. J.

**Joseph W. Honomichl,** 54, assistant general manager of sales for Standard Oil Co. (Ind.), died May 20 in Evanston, Ill.

**Frank L. Storey,** 72, retired construction foreman for Humble Oil & Refining Co., died May 24 in Liberty, Tex.

**Lester S. Amey,** 58, pipe line superintendent for Naph-Sol Refining Co., Muskegon, Mich., died May 18 in Grant, Mich.

**I. C. Eakin,** 78, formerly field foreman for Sinclair Oil Co. in the Shidler, Okla., area, died May 28 in Tulsa.

**Alexander Scott Donnelly,** 74, retired division production superintendent of the Kansas-Oklahoma division of The Texas Co., died May 28 in Tulsa.

**Elliott Davis Erwin,** 62, traveling field auditor for Mid-Continent Petroleum Corp., died May 24 in Tulsa.

**Otis C. Bearden,** 47, Hutchinson, Kans., oil driller, died May 28 in Wichita.

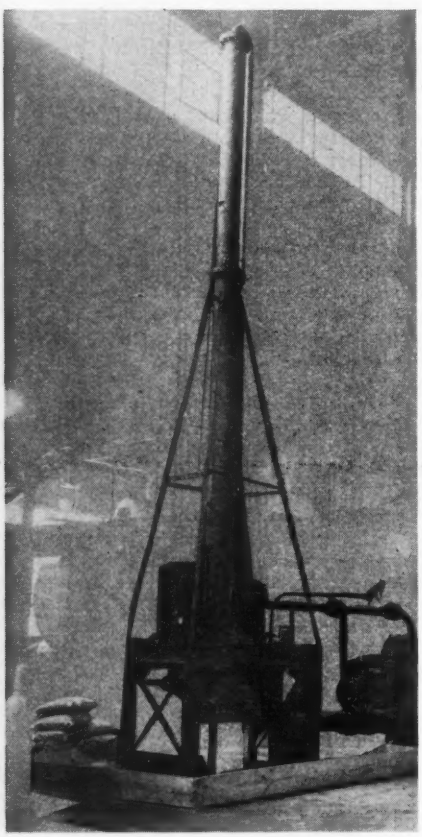
# TURBINE DRILL UTILIZES DRILLING FLUID TO ROTATE CONVENTIONAL ROCK BIT

*by George Weber*

**The Oil and Gas Journal here presents the first engineering article to appear on the newly developed turbine drill. Described are the initial field tests just completed in Union County, Arkansas.**

*Left: This sketch of the Edco Turbodrill shows subs, bearing, and guide-sleeve arrangement and both cutaway and center sections of the turbine itself. The entire tool measures 30 ft. in length, 10¼ in. o.d., and weighs 9,000 lb.*

*Below: The turbine was shop tested at Struthers Wells Corp.'s Titusville, Pa., factory using water plus 0.5 per cent Aquagel for lubrication. It was suspended inside a length of 13½-in. casing, anchored at the top with a special flange adapter to hold the reactive torque. Pressure readings at various fluid volumes were made at inlet and outlet points. The test employed conventional brake wheel and dynamometer setup, plus a tachometer to record rotational speed. Fluid was provided by a 14 by 16 by 7¼-in. pump*



DURING initial field tests conducted in May by Engineering Development Co. of Dallas, the new Edco Turbodrill penetrated 950 ft. of shallow section in a wildcat test drilling in Union County, South Arkansas. The drilling tool consists of a hydraulic turbine which, made up on the bottom of the regular drilling string, utilizes drilling-fluid pressure to rotate a conventional rock bit attached directly to its bottom sub.

In principle, the turbine drill, of which this unit is the latest to be designed and developed in this country, offers advantages over the mechanical rotation of drill pipe, and may in the future extend the life of drilling strings and permit certain reductions in drilling cost. Primarily, in obviating the rotation of drill pipe to drive the bit, the turbine drill would eliminate much drill pipe wear and avoid costly fishing jobs. Easier directional drilling and greater penetration rates with high rotational speeds are further possibilities offered by successful tools of this type.

The field test recently concluded was intended to augment shop tests of the new turbine motor, and check its operation under actual drilling conditions, using a normally equipped rig. Under those conditions, the drill performed satisfactorily to a depth of 1,000 ft. Conclusions as to the overall economic feasibility of the tool must await further studies of its performance in drilling to greater depths. Data from the test provided no direct comparisons with the conventional rotary methods.

### Turbine to 300 Hp.

The Edco turbine drill was designed and constructed for heavy duty. It measures 30 ft. in length and 10¼ in. o.d. Its total weight including subs for standard pipe and bits is 9,000 lb. The 90-stage, axial-flow turbine drives the bit directly without use of reduction gears. The unit recently tested is the first and only Edco drill made thus far. It was manufactured for Engineering Development Co. by Struthers Wells Corp. of Titusville, Pa., together with Allis-Chalmers Manufacturing Co. of Milwaukee, principal subcontractor.

Shop tests conducted in Titusville showed that the turbine delivered its peak power at 225 to 250 r.p.m. with

a circulation rate of 375 g.p.m. of water plus 0.5 per cent Aquagel, the maximum volume obtainable with the pump used. From test data it is estimated that, with the 10.6-lb. mud used in the field test, the turbine would develop 300 b.hp. at 450 r.p.m. at a circulation rate of 900 g.p.m. Under drilling conditions, fluid velocity in the turbine itself is expected to be held to 25 ft. per second.

### Field Test in Arkansas

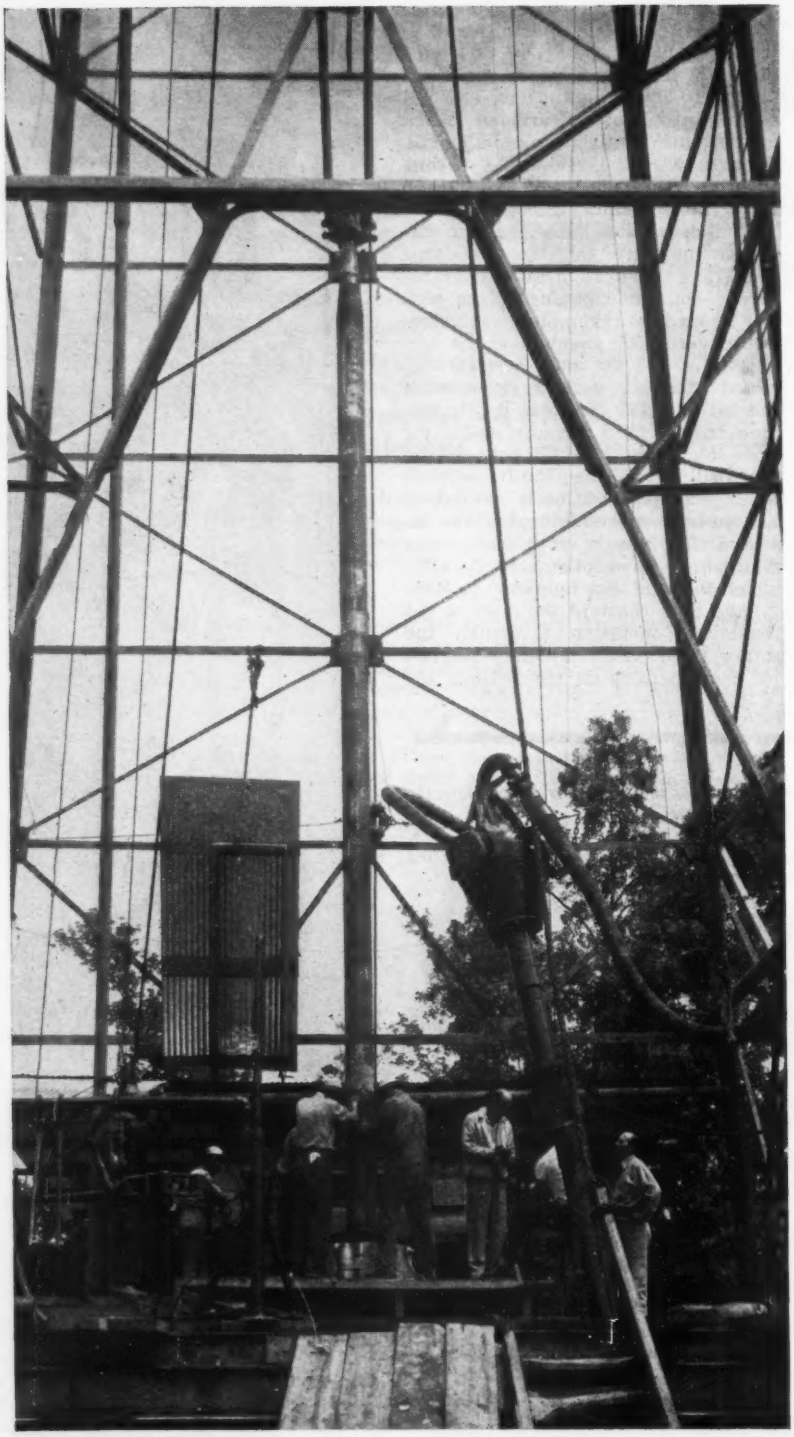
For the field test, a heavy steam rig designed for drilling to 10,000 ft. in South Arkansas was used. Two mud pumps, 15 by 7¾ by 20 in. and 16¼ by 7¾ by 20 in. were installed and fitted with new screens on suction lines. A shale shaker and four settling pits including the suction pit were provided to give adequate separation of sand and cuttings from the mud before its return to the turbine. Four oil-field boilers furnished 325-psig. steam for the rig.

The hole was begun by conventional rotary method, using a 20-in. bit. A 167-ft. string of 16-in. conductor casing was set and the plug drilled out to 182 ft. At that depth, the hole was circulated while the turbine was moved onto the rig floor. The drilling string comprised 4½-in. drill pipe plus two lengths of 5⅛-in. pipe immediately above the turbine. The tool was first tested at the surface to check pressure differentials across its length. Then a 13¾-in. three-nozzle, tricone rock bit was made up on the bit sub and drilling commenced.

Mud-circulation rate, pump-discharge pressure (at the standpipe base), and penetration rates were recorded continuously during the test. The larger mud pump, used exclusively, delivered 562 g.p.m. with the turbodrill at 182 ft. and the rate declined gradually to 475 g.p.m. with the bit at 1,132 ft., total depth turbine drilled. Mud pressure at the rig floor rose from 775 to 875 psig. during the drilling of the 950-ft. section. After 150 ft. had been drilled, a bottom-hole weight indicator was installed. But weight of 8,000 lb. was maintained for another 150 ft. after which the load was lightened to 5,000 lb. and held constant for most of the remaining operation. Although the rotary table was completely stopped for short periods during drilling, the

*Right: With surface casing set and plug drilled to 182 ft., the turbine is swung into the derrick and made up in the string*

*Below: Here the kelly is connected into the top sub of the turbine to test the tool at the surface before it is run on the string before initial drilling begins*



*With a conventional 13¾-in. tricone rock bit made up on the base of the Turbodrill, the tool is lowered into the hole. The drilling string comprised two lengths of 5 9/16-in. drill pipe immediately above the turbine, the remainder being 4½-in. pipe*

string was rotated throughout most of the test at 15 r.p.m. to avoid sticking pipe.

Under the recorded conditions of mud pressure and volume, engineers estimated that about 178 hydraulic horsepower was being applied to the turbine at 182 ft. With only one pump operating, the 4½-in. drill pipe proved insufficient to deliver the required fluid power to the turbine at about 1,000 ft. Thus, with no additional pump capacity provided, the power delivered to the turbine had declined to a point well below minimum requirements by the time the bit reached 1,132 ft. Substitution of a 5⅝-in. drill pipe for the 4½-in. string was originally planned when the turbine reached a depth requiring the larger string. The substitute string was not immediately available, however, and rather than compound pumps to augment power to the tool, operators decided to terminate the test at 1,132 ft.

An actual count of bit-rotation speed was of course not possible. However, based on tachometer records taken during shop tests under varying conditions, and the mud-circulation rates, discharge pressures, depth of hole, and bit weights recorded during field testing, engineers calculate that bit rotation ranged from 225 to 500 r.p.m., probably averaging 375 r.p.m. The higher bit speed was verified by cuttings which ran one-fourth normal size.

Bit cuttings were not regularly recovered and examined during the test. Nor was any driller's log available of a correlative section from the nearby Mount Holly field. As a result, no direct comparison of penetration rates with the two methods is yet possible. The 950-ft. section comprised sand, shale, including some sticky shale, and a few streaks of hard lime.

### Penetration Rates

Initially the bit cut 31 ft. in 10 minutes, later with 5,000 lb. bit weight, the penetration varied over 31-ft. intervals from 6.2 ft. to 0.8 ft. per minute. In the latter 31-ft. section a hard lime streak slowed the bit to 0.24 ft. per minute through 6 ft The drilling rate dropped considerably below 1,000 ft. for lack of sufficient power applied to the turbine. The final 31-ft. section bottomed at 1,132 ft. was drilled in 52 minutes.

Over-all, the rate of penetration while on bottom was 950 ft. in 541.5 minutes, or 1.75 ft. per minute. Excluding the last 124 ft. drilled with a seriously underpowered turbine, the rate was 826 ft. in 359 minutes or 2.3 ft. per minute. Normal rotary drilling, resumed from 1,132 to 1,423 ft. where 9⅝-in. intermediate casing was run, consumed 348 minutes on bottom. This rate of 0.835 ft. per minute cannot fairly be compared with the turbine drilling rate since harder formations were encountered below 1,132 ft. Turbine drilling began at 2:05 p.m. May 13 and ended at 7:58 a.m. the following morning, a total elapsed time of 17 hours 53 minutes.

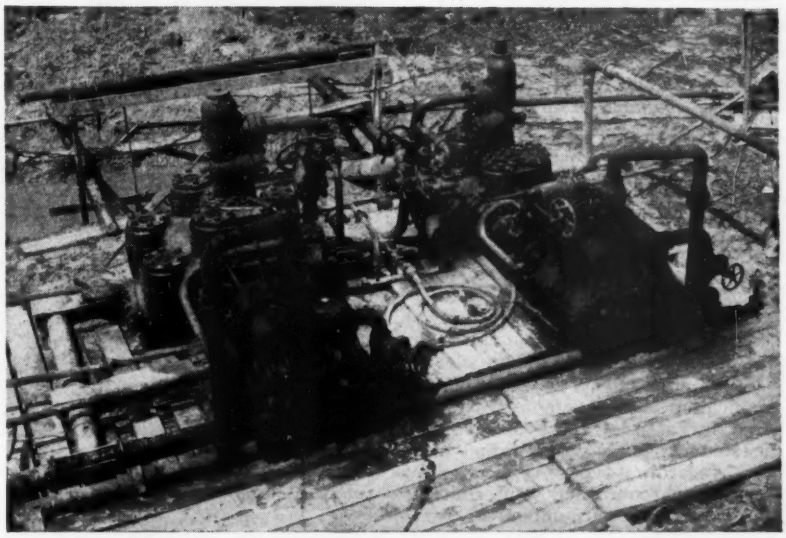
Normal mud control was maintained throughout the operation. Mud at the suction pit was kept to an average sand content of 0.5 per cent. Both bit and turbine were examined after the test and no appreciable wear to either was noted.

Photoclinometer and hole-section surveys showed a total drift of 3 ft. or 10½ minutes from vertical through

*In addition to many observers present at the test were these men in charge of operations, left to right: Michael Joel, engineer, and Critchell Parsons, president and general manager, Engineering Development Co., Dallas; Kenneth Yonkers, Allis-Chalmers Manufacturing Co., Milwaukee, principal manufacturing subcontractors; Jake Haas, general superintendent, Spartan Drilling Co., Vaughn subsidiary and drilling contractor on the test; and Charles A. Long, manager of Process Engineering Division, Struthers Wells Corp., Titusville, Pa., manufacturer of the turbine tools. Grady H. Vaughn of Dallas is chairman of the board, Engineering Development Co., and G. H. Vaughn, Jr., is vice president of that company and managing partner of Spartan Drilling Co.*

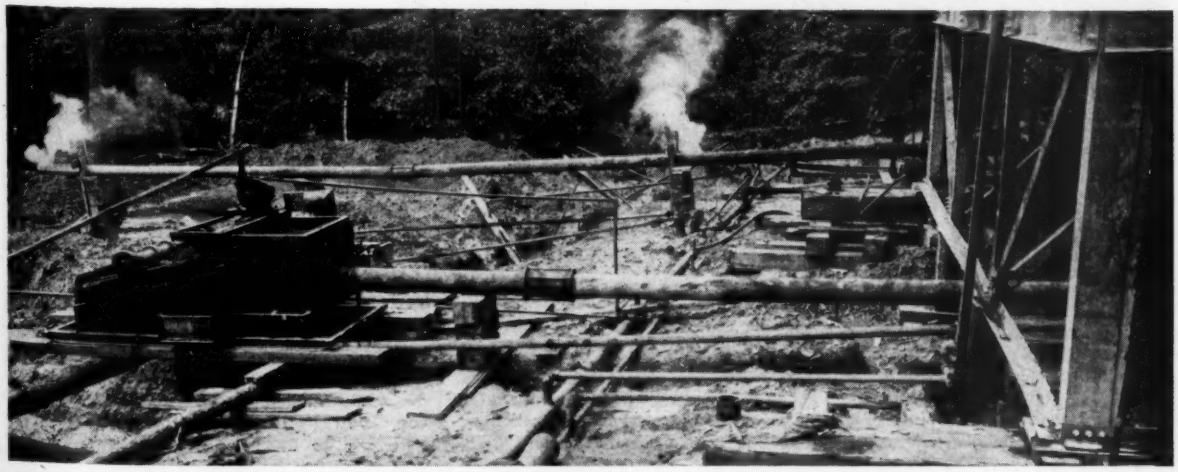
the section turbo-drilled, and a full-gage uniform-diameter hole practically throughout. In setting the 9⅝-in. intermediate casing, return of slurry was immediate. Difficulty is commonly encountered by operators in Mount Holly field because of formation washouts.

On the basis of findings, Engineering Development and the G. H. Vaughn interests plan a full-scale drilling operation, to begin in mid-June. The test, a 11,000-ft. Smackover well to be drilled in the Bradley area, South Arkansas, will be drilled with a similar rig, using two mud pumps plus one standby pump and normal drilling fluid lines on the surface. The string initially will comprise 6⅝-in. drill pipe; later a mixed string with 5⅞-in. pipe will be used. More detailed public announcement of the start of this turbine drilling operation will be made shortly.



*Above: Two steam mud pumps were rigged up, only one being used for the turbine test. Pumps were equipped with new suction screens to prevent introduction of foreign objects which might injure the turbine blades. The steam rig, powered by four oil-field boilers, is of the size normally used in drilling to the average 7,000-ft. well depths of the area*

*Below: The conventional shale shaker is a necessity in turbine drilling. Added settling pits for mud were provided to allow further settling of sand and fine cuttings. Sand content at pump suction averaged about 0.5 per cent during the turbine test*



# APPLICATION OF RECORDING Type Meters AT ELECTRIC PUMPING WELLS

*by R. E. Hammond*

**More extensive use of electric pumping during recent years has demonstrated both the need for complete information concerning load characteristics and the difficulties encountered in obtaining accurate field measurements of the pulsating and variable loads encountered in oil well pumping. Information which has been found helpful in contributing to increased efficiency and economy at an electrified operation is discussed, and means of obtaining dependable measurements are described. Examples of charts obtained by different type recording instruments are shown and their comparative advantages related. Sample calculations of useful data not directly readable from meter charts are presented, and the application of such information for improving operating efficiency of not only the power distribution system and associated electrical equipment but also the subsurface pumping equipment is described.**

**The author is with Carter Oil Co., at St. Elmo, Ill.**

MODERN developments in electric pumping and its recent expanded application have demonstrated the need for a greater use of electrical instruments and particularly those of a recording type. Application of time-switch-controlled intermittent pumping to large numbers of wells has made necessary the use of a recording-type wattmeter at the power plant or source of power to insure that over-all requirements are maintained as nearly uniform as possible. Similar installations of a portable type are often made at field substations to confine a field study to a smaller group of wells.

*Fig. 2—(Left) Measuring motor current with tong test ammeter. Fig. 3—(Right) Motor control cabinet showing "dummy" fuse cartridges used to connect recording-type meters in series with motor*

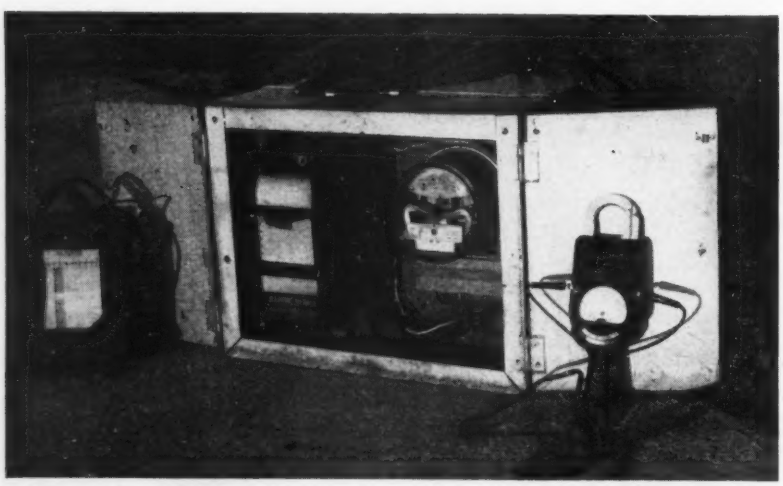


*Fig. 1—Instruments used for testing electric pumping wells—inkless-type recording ammeter, wattmeter test cabinet, hook-on type ammeter-voltmeter*

To obtain maximum efficiency and economy throughout an entire electric distribution system, it is important that motor sizes be correlated with actual loads, that pumping equipment be properly balanced, and that power factor of the system load be maintained at the optimum value. In addition to this information of a purely electrical nature, the oil operator is interested in maintaining his individual well subsurface pumping equipment in good condition at minimum expense. All such information can be secured with electrical instruments, but the major portion of

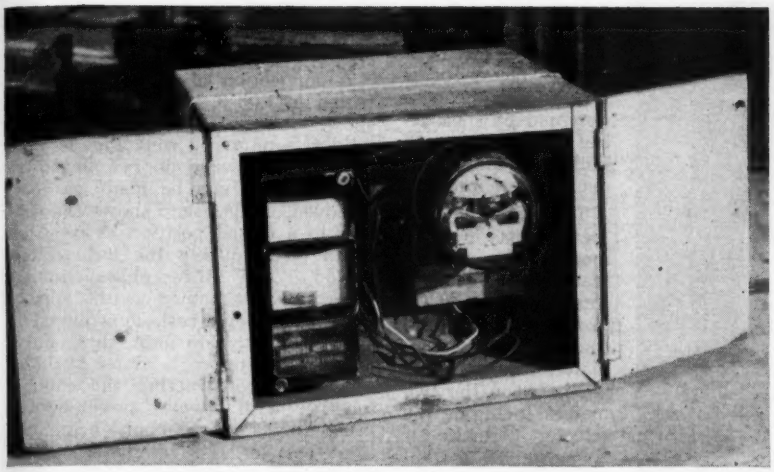


*Fig. 4—Wattmeter test cabinet with doors open*

it requires the use of recording meters for complete and dependable results because of the pulsating character of the typical oil-well pumping load.

### Description of Instruments

The instruments used at a power plant or source of purchased power usually include an integrating-type watthour meter to measure total energy and a recording-type three-phase wattmeter to provide a continuous record of power output. At power-plant switchboards, indicating-type voltmeters and ammeters are usually installed, while at sources of purchased power, two integrating-type watthour meters are often provided so that average power factor can be determined by connecting one meter to measure var-hours.

For test work in the field, portable-type instruments are usually used. These include the same type of instruments that are installed at plants or power sources except that weather-proof cases are required. An example of a group of portable meters which have been found useful for field testing is illustrated in Fig. 1. Pictured are an inkless-type recording ammeter, a wattmeter test cabinet including both a three-phase recording wattmeter and an integrating-type watthour meter, and a hookon-type ammeter-voltmeter. These instruments will furnish all necessary information at pumping wells powered by 440-volt motors up to 7½ hp. in size. For tests at wells having larger-sized motors or at field substations, it is necessary that this test equipment be supplemented by current and perhaps potential transformers.

### Application of Hookon-Type Ammeter

The hookon-type ammeter-voltmeter illustrated in Fig. 1 is useful for measuring instantaneous values of current flowing through a wire without breaking the wire or making any changes in electrical-circuit connections. The hinged armature of the meter can be opened and closed around the outside of an insulated wire, and a choice of scales permits the measurement of currents up to 600 amp. The same meter contains two connecting posts for potential leads, and by snapping a selector switch from current to voltage, potentials up to 600 volts can be measured.

This instrument is simple and quick to use, as indicated in Fig. 2 which shows a motor-current test being made at the motor-control cabinet. It is a convenient instrument for determining thermal loading of electrical equipment or distribution lines, and it furnishes accurate instantaneous values of current and voltage for steady load conditions. It has the same disadvantage as any other indicating-type instrument when applied to oil-well pumping loads, however, in that the pointer fluctuates between wide limits under the pulsating-type loads which are encountered and dependable values of either average or peak currents cannot be determined. Voltage fluctuations are usually less severe, so the meter can be depended upon for a reliable indication of average potential. This instrument can be obtained in leather carrying case for approximately $80.

### Application of Wattmeter Cabinet

The wattmeter cabinet shown in Fig. 1 was assembled to provide instruments which were considered necessary for accurate well testing in a manner which would permit portability and reduce the time necessary for installation at a well. The three-phase inkless recording wattmeter provides reliable values of maximum and minimum power demands encountered during each cycle

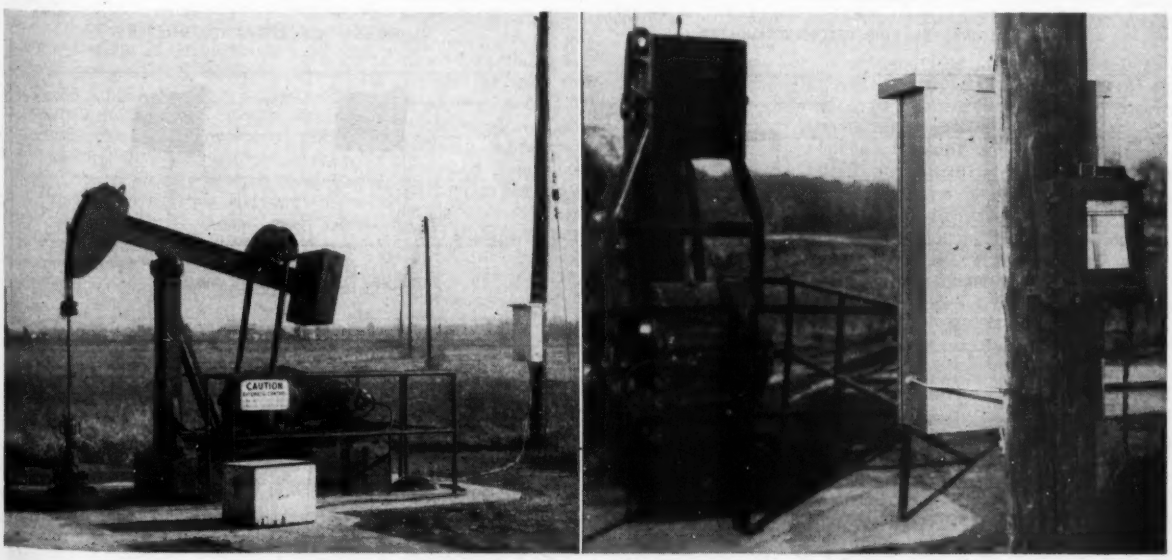



*Fig. 5—(Left) Wattmeter test cabinet connected at pumping well. Fig. 6—(Right) Inkless-type recording ammeter connected at pumping well*

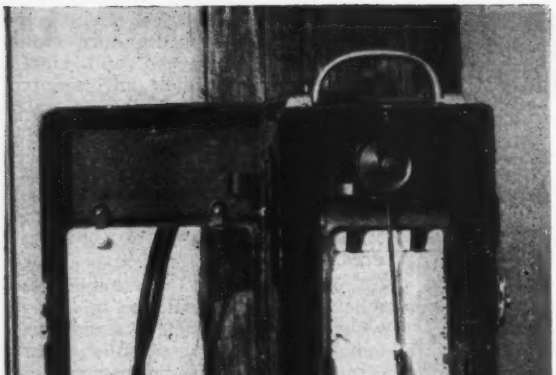


*Fig. 7—Inking-type recording ammeter*

of a pulsating load and also furnishes a record of how these values change with time.

The watthour meter is useful in measuring energy consumed over a considerable period of time or for obtaining more accurate values of average loads over a short interval than can be read from the recording meter chart. A set of switches is provided in the leads to the watthour-meter potential coils which permit the use of this meter for the measurement of var-hours if desired. Thus, by the use of this one meter, a reliable figure for average power factor of a pulsating load can be obtained by measuring average values of both kw. and rkva. over a short interval.

The protective cabinet consists of sheet metal over a wooden frame with sufficient internal bracing to provide a substantial foundation for all meters. Internal wiring between the two meters, including the selector switches for changing from real to reactive power measurements, are connected to a terminal block mounted within the cabinet. A double length of three-wire cables approximately 50 ft. long is also connected to the terminal block, so the only work required for installing the test cabinet at a well involves connecting the cable ends at the motor-control cabinet. The six wires involved in this connection include three line and three load wires which are connected permanently to the ends of three dummy fuse cartridges which do not contain fuse links. Thus, the connection of these wires at a motor-control cabinet simply involves removing the three regular fuse cartridges and replacing them with the three dummy fuse cartridges connected to one end of the test-cabinet cables.

A connection of this sort is illustrated in Fig. 3, while Figs. 4 and 5 show views of the test cabinet as used at a pumping well. Fig. 4 shows the cabinet with doors opened so that readings can be made or chart removed, while Fig. 5 shows the cabinet in a closed position as it is left at the well during the desired test period. The three-phase inkless recording wattmeter with spring-clock chart drive costs approximately $350, while the 15 amp. three-phase watthour meter costs about $50. Materials for constructing the cabinet, together with selector switches, terminal block, and labor, bring the total cost of the cabinet including meters to approximately $450.

Although the entire test-cabinet assembly weighs approximately 100 lb., it is regarded as a portable installation because one man can easily place it on the concrete driveway of a pumping well from the trunk of a passenger car. The wattmeter cabinet can be connected and placed in service in a matter of only 1 or 2 minutes because all wiring beyond the connecting cables is permanent, and because the recording meter is an inkless type in which recording is accomplished by a striker bar and a typewriter ribbon so that no time is required to fill ink wells, clean inking pens, etc.

**Application of Recording Ammeters**

The inkless-type recording ammeter illustrated in Fig. 1 is a highly portable instrument mounted in a

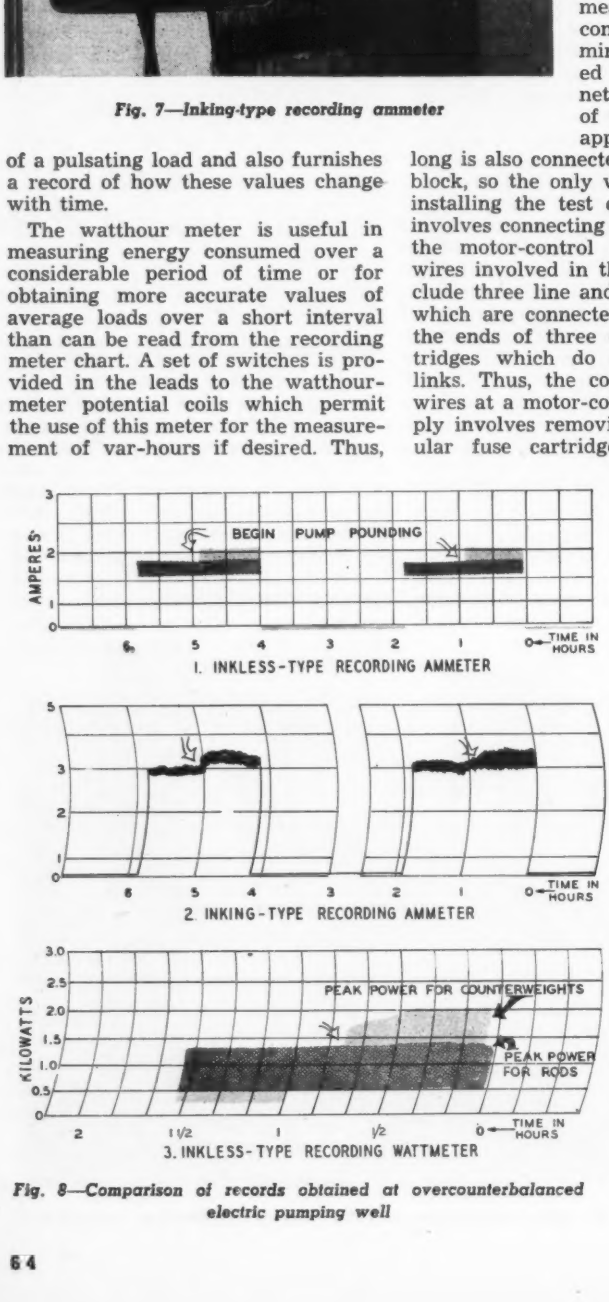



*Fig. 8—Comparison of records obtained at overcounterbalanced electric pumping well*

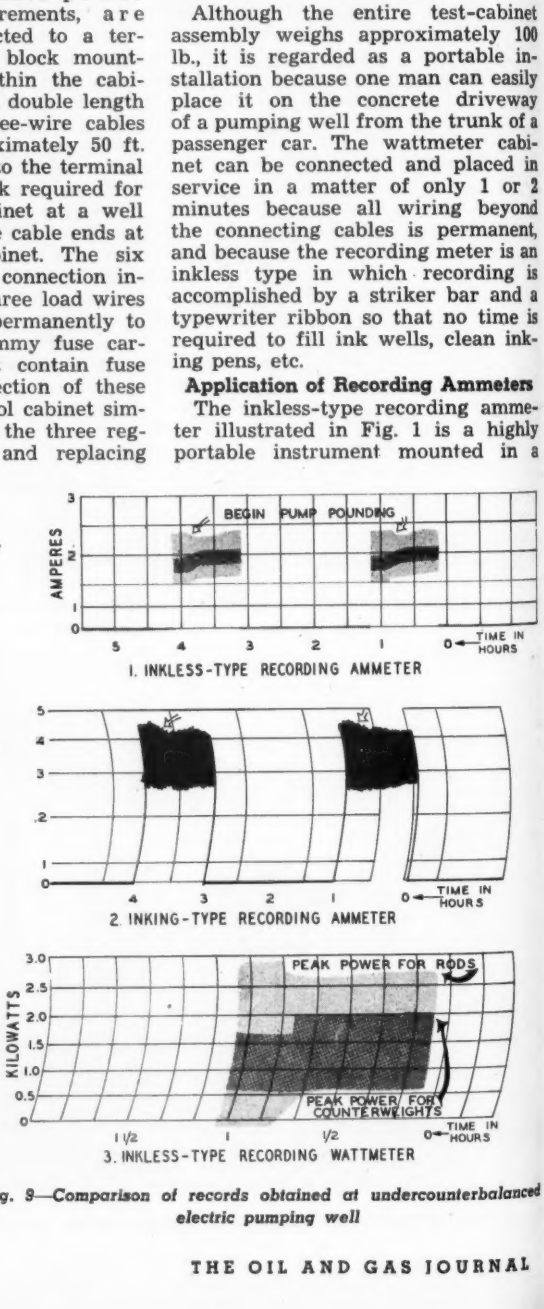



*Fig. 9—Comparison of records obtained at undercounterbalanced electric pumping well*

weatherproof case which weighs only 12 lb. It is normally mounted on a power pole, as shown in Fig. 6, when a record of motor current is desired. A nail is driven into the well service pole immediately behind the motor-control cabinet, and the recording ammeter is hung on this nail. Three wires are required for connecting this meter, two current leads being equipped with a dummy fuse cartridge to obtain a series connection with the motor and the third being connected to one of the other two phases to obtain a 440-volt potential for the telechron motor which drives the chart.

This type meter costs approximately $90 and has the advantages of simpler installation and greater portability than the wattmeter test cabinet. Generally speaking, it furnishes the same sort of record as the recording wattmeter in that maximum and minimum current values of a pulsating load are reliably portrayed, but since current is not directly proportional to power in a fluctuating alternating current circuit involving changing power factor, the recording ammeter does not furnish a true indication of load balances.

Shown as Fig. 7 is an inking-type recording ammeter which meter costs about the same and has the same advantages of portability as the inkless type. Experience with this type of meter has not been entirely satisfactory because of the clogging tendency of the inking pen and reservoir and because the wet ink not infrequently runs and smears the chart. It has been found that with the inked chart it is not always possible to detect the peak current during the lower half-cycle.

### Comparative Results

The test instruments previously described can be used to determine electrical load characteristics of individual wells or groups of wells so that an operator can select the most efficient size of equipment and can obtain proper load balance. In addition to this use, the meters have been found to be of great value in studying the performance of subsurface pumps and pumping equipment. Their use provides a record of electrical loads on motors driving intermittent pumping wells, and these records show the portion of each pumping period during which the subsurface pump is pounding fluid. This time is indicated because the load balance and average power requirements change when the subsurface pump goes from pumping to pounding conditions.

### Normal Load for Well

The normal power load of a pumping well consists of two successive peaks during each pumping cycle, one when the rods are being raised and another on the downstroke while the counterweights are being raised.

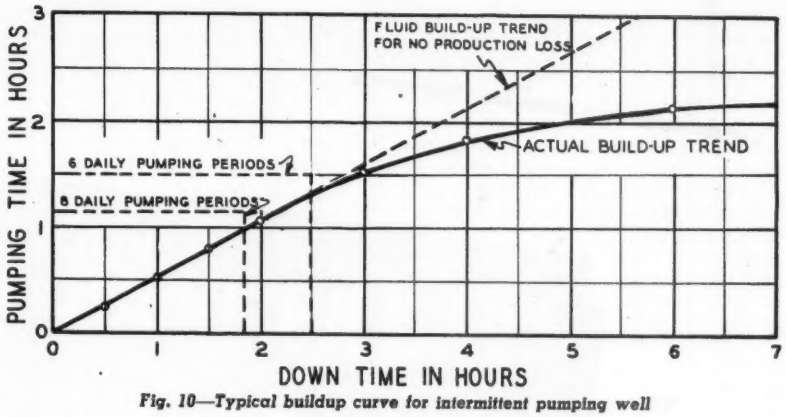



*Fig. 10—Typical buildup curve for intermittent pumping well*

The peak power required on the upstroke is relatively constant, because the same load of oil and rods is on the pump and its lifting is being assisted by the drop of a fixed amount of counterweights.

The peak power required on the downstroke changes, however, because this load consists of the raising of a fixed amount of counterweights assisted by the dropping and counterbalancing effect of the weight on the rods. This latter force is limited to the weight of the rod string in fluid while the well is pumping but increases to the total weight of rods and fluid on the traveling valve when the well is pounding, because then the traveling valve remains closed during all or at least the major part of the downstroke. The increased counterbalancing effect during pounding reduces the peak power demand required to raise the counterweights, and this decrease is the indicator on the meter chart which shows the beginning of pump pounding.

Fig. 8 compares the records obtained by both inkless and inking-type recording ammeters with that obtained by an inkless-type recording wattmeter at an overcounterbalanced pumping well, and Fig. 9 compares charts made by the same type instruments at an undercounterbalanced pumping well. The particular well illustrated in Fig. 8 was running slightly more than 1½ hours out of every 4 hours or a total of about 10 hours per day. The well pumped for approximately 45 minutes out of each pumping period, as indicated by the arrows on Fig. 8, or a total of 4½ hours per day. On the inkless-type charts obtained from the recording ammeter and wattmeter, it will be noted that the peak power required to raise the counterweights during pumping conditions is greater than the peak power required to raise the rods, but both of these peaks can be detected from the chart. The record obtained from the inking-type ammeter, on the other hand, shows only the drop in peak demand required for raising the counterweights on the downstroke after pump pounding begins.

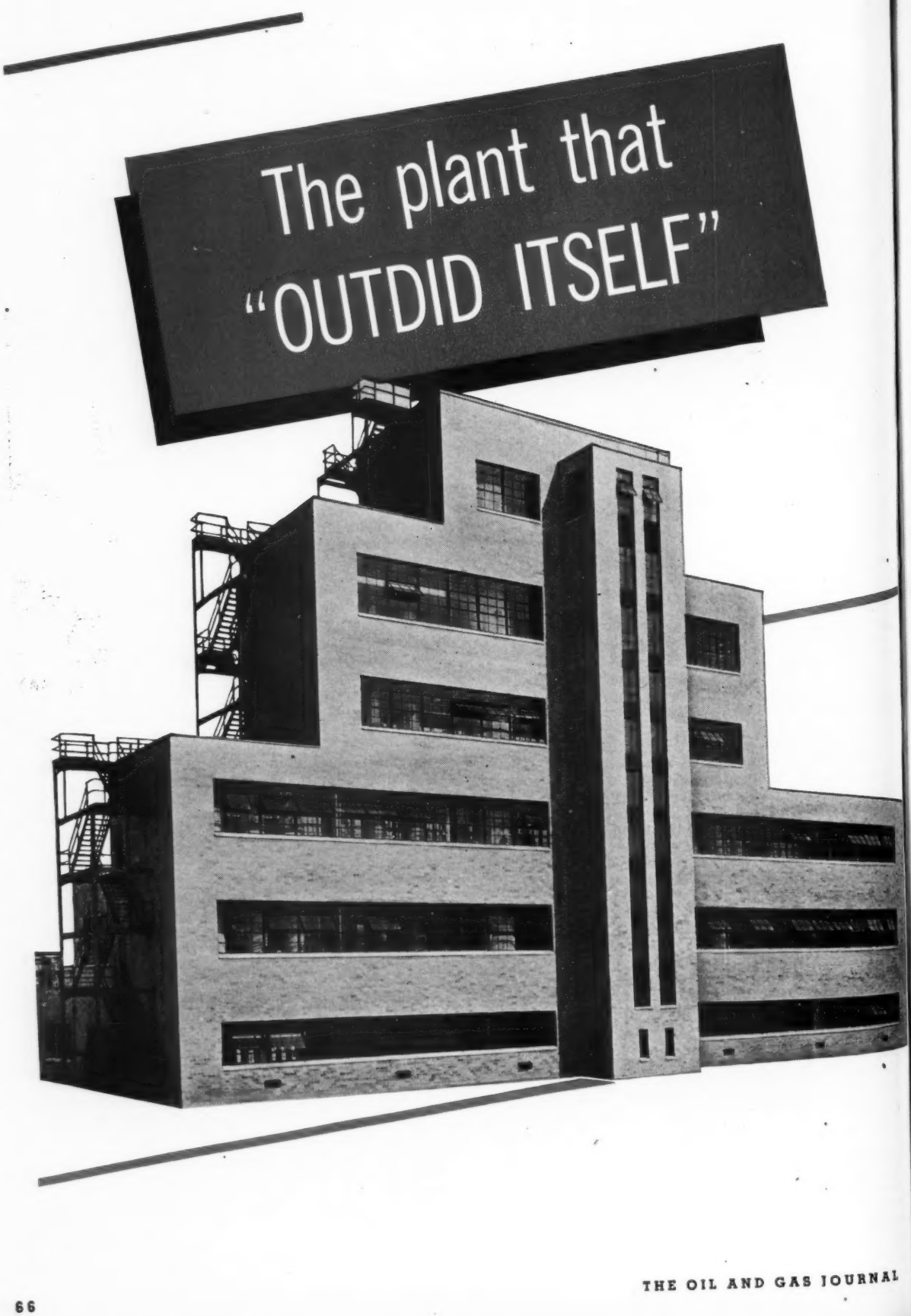
Contrasting in Fig. 9, the peak power required to raise the counterweights during pumping conditions is less than that required to raise the rods, but the usual decrease occurs when pump pounding begins. Since this particular well had a larger-sized pump which results in wider fluctuations between maximum and minimum loads, and because the degree of unbalance is more severe, the decrease in downstroke power when pounding begins results in a slight increase in upstroke power peak because of a slight increase in initial upstroke pumping speed.

This increase in upstroke power peak results in pounding being indicated on the chart made by the inking-type recording ammeter at this particular well, but as a general rule, this type meter will not indicate pounding on an undercounterbalanced well because the greater upstroke power peak is nearly constant and the change in lesser downstroke power peak is blotted out by the ink. Efforts to overcome this difficulty and to improve the record obtained with an inking-type recording ammeter by means of a small capacitor shunted to the test motor were unsuccessful.

The capacitor size was selected to provide nearly unity power factor for the load current being metered with the thought that detection of a small average current drop would then be possible regardless of load balance. These changes were found to be so small, however, that they could not be distinguished from other current changes resulting from small variations in distribution system voltage. It will be noted from Fig. 9 that the minimum power load on the downstroke as shown by the wattmeter chart actually falls below zero after pounding begins, while no such condition can be detected from the ammeter records because current magnitude only is registered without regard to direction of flow.

### Sample Electrical Calculations

A more critical examination of Figs. 8 and 9 will demonstrate the previously mentioned fact that the watt-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meter chart provides the most reliable indication of actual electrical values. In Fig. 8 the wattmeter record shows an average load while pumping of about 1.1 kw. and an average load while pounding of about 0.85 kw. These compare with actual average load values of 1.09 kw. and 0.83 kw. as determined from timing the disk of the integrating watthour meter during pumping and pounding conditions.

The average voltage at this location was measured at 450 volts, and the average reactive power was determined at 2.80 rkva. by timing the disk of the watthour meter with the switches set to reverse the potential connections. The reactive power thus measured, together with the 1.09-kw. real power average during pumping, indicates an average motor load of 3.0 kva. for this well. After the total kva. is calculated, the average power factor of 36.3 per cent and the average current of 3.85 amp. can be computed. This latter value compares with an indicated average value while pumping of only 3.5 amp. on the inkless recording ammeter chart and an average of 3.2 amp. on the inking-type ammeter chart.

It must be remembered that the average values of current calculated from power and voltage measurements or read from the ammeter charts of pulsating loads cannot always be used to determine accurately motor thermal loading, as heating effect varies with the square of the current. For the degree of current fluctuations normally encountered in the pulsations of an oil-well pumping load, an increase in average thermal current above average current by 1 to 5 per cent can be expected.

Such equivalent value of average thermal current can be measured with a thermal demand-type ammeter or can be closely approximated by squaring the current peaks indicated on the inkless recording ammeter chart. By the latter method, an average thermal current of about 3.55 amp. is computed for the chart shown in Fig. 8, indicating an increase of approximately 0.05 amp. or 1.4 per cent over the chart average current of 3.5 amp. Applying this increase to the more accurate wattmeter determined average current of 3.85 amp. gives an estimated average thermal current of 3.9 amp. for this particular 3-hp. motor which has a current rating of 4.5 amp. Thus the motor is thermally loaded to 86.7 per cent of capacity, whereas its average power output is only 32 per cent of rating based on the measured input of 1.09 kw. and 0.375 kw. losses at operating conditions as determined from motor performance test curves.

Viewed differently, the 0.96 hp. output of the 3-hp. motor would require only 3.0 amp. for a steady load instead of 3.9 amp. needed for the pulsating load having an average of the same magnitude. The pulsating load is therefore responsible for a 30 per cent increase in required motor thermal capacity.

A similar comparison for the well illustrated in Fig. 9 gives average power demands as read from the recording wattmeter chart of 1.5 kw. while pumping and 1.3 kw. while pounding and values of 1.53 and 1.33 kw. as measured by timing the disk of the watthour meter. Average voltage and reactive power at this location were measured at 445 volts and 2.70 rkva., respectively, indicating 3.1 total kva., 49.3 per cent average power factor, and 4.02 amp. average current during pumping.

This value of current compares with an average of 3.8 amp. indicated on the inkless meter chart and 3.4 amp. indicated on the inking meter chart. Average thermal current is esimated at 4.1 amp. to indicate that this 3-hp. motor is thermally loaded to 91.1 per cent of rating, while its calculated power output of 1.51 hp. represents only 50.7 per cent of motor rating. The current drawn for a steady load of this magnitude is 3.1 amp., so the 4.1 amp. average thermal current represents an increase of 32.2 per cent in motor thermal capacity required for this pulsating load which fluctuates over a slightly greater range than that of the well shown in Fig. 8.

Detailed electrical calculations of the type just described are not made at every well tested but simply illustrate the method that is used to determine average power and thermal loading of electrical equipment and information regarding load balance. Such tests are usually made to determine proper corrective measures required for individual motors, substations, or generating plants which have developed operating difficulties resulting from either overload conditions or nonuniform load demands.

### Calculation of Subsurface Pump Efficiency

In order to determine the condition of a subsurface pump at an electric pumping well, it is only necessary to correlate the pumping time indicated by a recording meter chart with the displacement and actual production delivered by the pump. Charts of the well illustrated in Fig. 8 indicate a total actual pumping time of 4½ hours per day out of 10 hours running time, and the well is equipped with a 1½-in. R.C.D. metal pump operated at seventeen 18-in. strokes per minute. Thus, the pump has a displacement of 3.34 bbl. per hour or a total of 15.03 bbl. for 4½ hours' pumping time, while production tests of the well show its actual potential to be 17 bbl. per day. Fluid delivered during the 4½-hour pumping period is calculated at 13.1 bbl., indicating a pump volumetric efficiency of 87 per cent when pumping, if it is assumed that during pounding time, the pump delivers at an hourly rate equal to the well potential divided by 24 hours, or a total of 3.9 bbl. for the 5½ hours per day that this particular pump pounds fluid.

Tests obtained at different pumping schedules providing for varying percentages of pounding time indicate that this assumption is generally valid, although a slightly optimistic value of pump volumetric efficiency is obtained in some instances because the hourly fluid delivery when pounding first develops is somewhat in excess of one twenty-fourth of well capacity. This conditions exists because some wells show production increases for the first day of continuous pumping following a period of intermittent operation of 10 to 15 per cent above the well potential with time switch pumping, although a continuation of straight time pumping brings about a return to the intermitted potential or lower on the second or third day after the change.

At such wells production assigned to the pounding interval is low, so the remainder of the pump delivery allocated to pumping time becomes high and results in a higher pump volumetric efficiency being calculated. The degree of error introduced into the computation by this factor depends upon the producing characteristics of the well and the relative time intervals for pumping and pounding, but the calculated volumetric efficiency is usually accurate to within 2 per cent. When pounding time exceeds 50 per cent of total running time, indicated pump efficiency might be high by as much as 5 per cent.

Similar calculations for the well illustrated in Fig. 9 indicate that its cup-type pump has a volumetric efficiency during pumping of 63 per cent. This well runs 1 hour out of every 3 or a total of 8 hours per day, and it pumps approximately 40 minutes for each of its 8 periods per day or a total of 5.3 hours. This well has a 2-in. common working-barrel pump which is operated at seventeen 18-in. strokes per minute for a displacement of 4.78 bbl. per hour or 25.3 bbl. for the 5.3 hours of pumping.

Production tests of the well showed the pump was delivering 18 bbl. of fluid per day of which 16.0 bbl. is calculated as being produced during the 5.3 hours of actual pumping. Cups and valves of this common working-barrel pump were last changed in August 1944, or 40 months prior to the recording-meter tests. The relatively low volumetric efficiency calculated for this pump indicates that it has experienced considerable wear during the 40-month period and will soon require repair.

### Field Use of Test Equipment

In actual field use, a program has been set up whereby all pumping

*(Continued on page 89)*

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# Removal of Organic Deposits From Tubular Heat Exchangers

*by K. C. Edson* and J. S. Powell**

TUBULAR heat exchangers have long been the most widely used method of heat transfer in industrial processes. They have also been a source of costly maintenance and production curtailment in certain applications due to heavy organic deposits that form in the tubes or in the narrow spaces between the tubes. These organic deposits can form on the tubes from polymerizable material contained in the fluids passed over or through the tubes, or by the deposition of sludge material contained in the fluid on or in the restricted areas of the exchanger tubes.

For the removal of deposits various solvents are used such as hot water, hot oil, and cleaning compounds whenever applicable. Solvent methods are adequately described by P. S. Otten.[1] Unfortunately, however, a large number of polymer and sludge deposits will not respond to such treatment and therefore other methods are necessary.

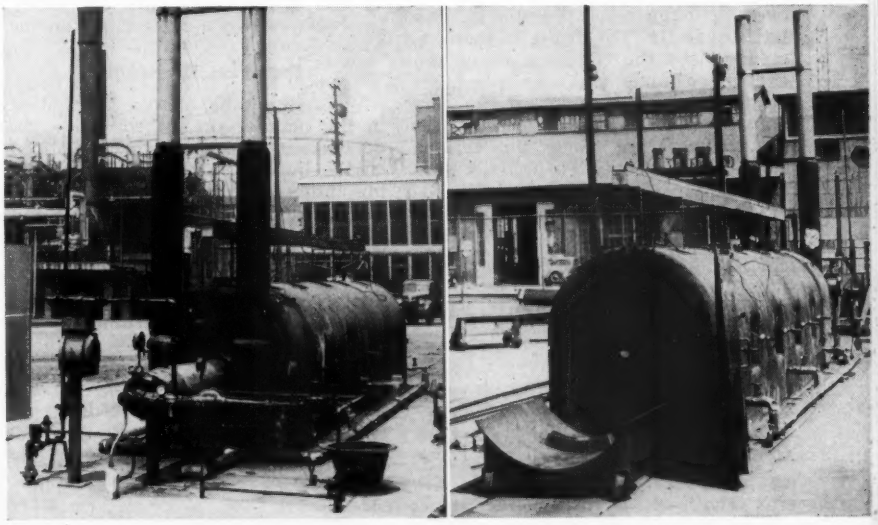
Mechanical cleaning has been and still is, in most plants, the primary method of cleaning heat exchangers fouled with this insoluble organic material. J. H. Housman[2] has presented a good discussion of this type of cleaning. However, mechanical cleaning can be costly, time consuming, and in some instances where the exchangers are cleaned in place, requires curtailment of production while the unit is out of service. For example, if the exchanger to be cleaned has the deposit on the inside of the tubes, each tube has to be drilled separately. At last one and in some cases three or four passes are necessary on each tube before it is cleaned properly. In some of the larger exchanger-tube bundles having more than a thousand tubes per bundle this operation may take several days. If the deposit is on the outside of the tubes it is often even more difficult to remove deposits from inaccessible portion of the inner tubes.

*Butadiene production department, Southern California Gas Co., Los Angeles.

### Exchanger Cleaning by Burning

Due to the difficulty and expense involved in mechanically cleaning exchanger-tube bundles, the possibility of removing the organic deposit by combustion was investigated. Preliminary attempts at uncontrolled burning indicated that considerable damage to the exchanger may occur due to uneven expansion of the tubes. Therefore, the temporary exchanger-tube-bundle oven shown in Fig. 1 and later the permanent oven shown in Figs. 2 and 3 were designed and constructed and have been used for the past 2 years with gratifying results.

Construction of the oven was designed to accurately control temperature, oxygen content in the gas, and gas circulation. The proportioning mixer and wide-range burner assembly permits control of temperature and oxygen content, while the construction of the oven with the funnel attachment permits control of gas circulation. As can be seen in Fig. 4 this funnel attachment which connects the tube bundle with the burner assembly forces the gas through the inside of the tubes. After leaving the tubes the gas must travel back over the outside of the bundle before entering the exhaust stack.



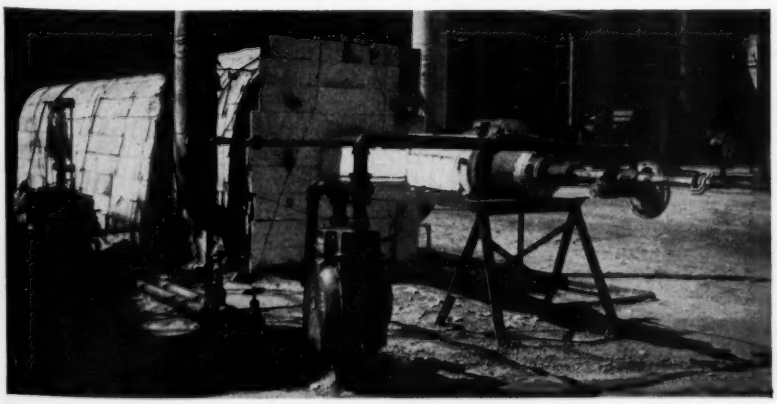


*Fig. 1—(Left) Experimental exchanger-tube-bundle oven*

*Fig. 2—(Left, above) Permanent exchanger-tube-bundle oven—rear view*

*Fig. 3—(Right, above) Permanent exchanger-tube-bundle oven—front view*

Figs. 5 and 6 show fouling on both the inside and the outside of the tubes. Fig. 5 is the sludge-type de-

posit located predominantly in the first half of a two-pass exchanger bundle. Fig. 6 shows the polymer-type deposit formed on the outside of the tubes.

The exchanger-tube bundle to be cleaned is first checked with an air hose to determine whether the tubes are plugged with deposit. Those tubes found to be plugged are mechanically brushed or drilled in order to insure passage of the combustion gases and oxygen through the tubes. One pass is all that is necessary in this case. The tube bundle is then placed on dollies and rolled into position in the oven. The funnel is attached to the forward end and thermocouples are inserted in the tubes at various points in order to determine the temperature during the operation.

Next the burner is started with the blower mixer set on the lowest firing rate with no excess air. The bundle and oven are purged of oxygen by this combustion gas while the oven and bundle are being brought up to temperature. From the safety standpoint it is best to analyze the exhaust gas to be sure that all oxygen originally present in the oven is removed before the oven and bundle reaches a temperature of 400° F.

On heating, the deposits will release some organic vapors and may form an explosive mixture within the oven if oxygen is present in any large quantity. The firing is then increased and the temperature of the exchanger bundle and oven is brought up to the ignition point of the carbonized organic deposit. As the ignition temperature varies for various substances it is best to predetermine the ignition temperature in the laboratory on a sample of the deposit. However, in most cases the material will start to oxidize from 550° to 850° F.

When the desired temperature is reached, excess air is added to the burner and increased slowly until approximately 5 per cent oxygen is entering the oven with the combustion products. In some instances it is necessary to maintain a lower oxygen content, in the order of 0.5 to 1 per cent in order to control the temperature in the oven. The temperature and oxygen content are maintained until the oxygen content of the exhaust gas equals the oxygen content of the gas entering the oven. At this point the burner is shut off and the oven allowed to cool. The oven is then opened and the exchanger removed. A small amount of residue usually remains as a loose powder on and in the tubes. This can easily be removed by a stream of air or water.

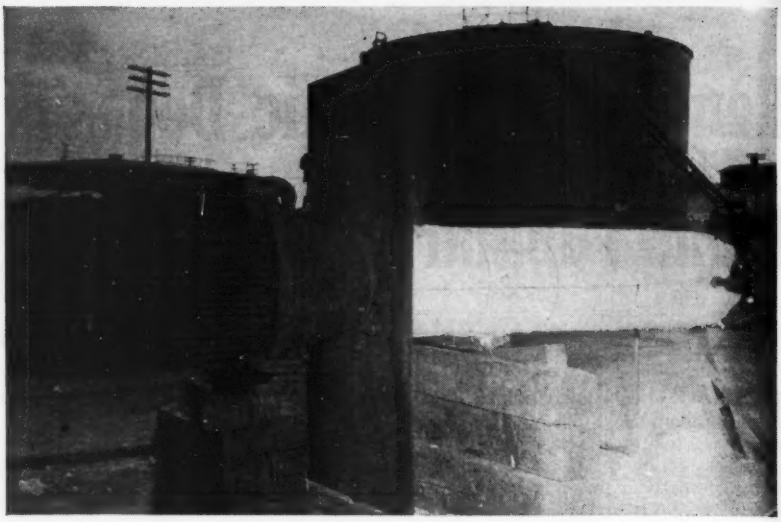


*Fig. 4—Exchanger-tube-bundle and burner assembly—showing funnel connection*

### Effect on Exchanger

When the tube bundle is handled in the manner prescribed above, no deleterious effect has been noticed on the bundles. The slow even heating and cooling allow all of the tubes to expand and contract together and thus not set up any stress in the bundle or on the heads. Of the more than 100 bundles cleaned in this manner no difficulty has even been encountered in the warping of the bundles nor in loosening of the tubes in their sheets.

Since carbon steel is the metal most widely used due to its low cost and availability, most of the exchanger bundles cleaned were of this type. However, admiralty-metal bundles have been cleaned by this method with equal success. Temperature of the oven is maintained at approximately 550° F. when admiralty-tube bundles are being cleaned, as compared to approximately 800° F. for carbon-steel exchangers. It was found necessary to maintain this lower temperature in the case of the admiralty-metal bundles in order to prevent the tubes from loosening in the sheets. To date no chromium-molybdenum nor chromium-nickel alloy steel exchanger bundles have been cleaned by this method; however, no difficulty is expected.


### Acknowledgement

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*Fig. 5—Sludge-type organic deposit on inside of tubes*

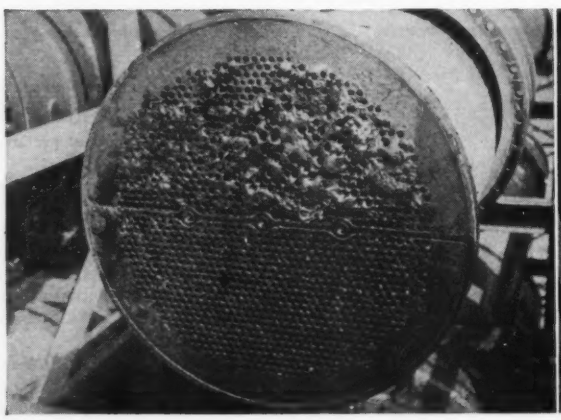


*Fig. 6—Polymerized deposit on outside of tubes*

# flexible hose in Rotary Drilling Operations

*by Lawrence Cranston* and Robert Leonard**

WITH the evolution of improved drilling techniques, difficulties in operation have led to progressive changes from 45 to 50 and more recently to 55-ft. lengths of rotary hose. Concurrently, the hose diameters have been increased to the point where 3-in. i.d. hose is now in general use on standard rigs. Quite naturally over a period of years, pressures have been increased and indications are that both size and pressure will possibly be increased still further.

Flexible rotary hose has been called upon to operate under the changed conditions and in a majority of the cases has done so most satisfactorily. On the other hand there have been instances where the hose could have given further service if changed conditions had been compensated for accordingly. In view of present relatively high operating costs it has become increasingly important to obtain the ultimate from all items used in the drilling operation.

To this end an attempt will be made in this article to consider proper methods for installation, care and use of hose items with the express purpose of contributing to lower operating costs.

### Short Hose May Kink Near End

Where trouble with rotary hose has been experienced it has generally been manifested by kinking and rupturing of the hose body within 4 or 5 ft. of the ends. When this has occurred it has been found to be due, for the most part, to hose length being too short. Failures of this type may occur at either the standpipe or swivel end depending upon the relationship of standpipe to hose length. This relationship is of utmost importance since the practice of making mouse-hole and rat-hole connections has come into general use.

Fast-drilling areas such as Mississippi and the Gulf Coast have practically adopted the mouse-hole connection as standard. This has been responsible for placing strains upon the hose due to the fact that standpipe heights have been increased to approximately 50 ft. in order to allow clearance of the tool string over the derrick floor. There is nothing wrong with this practice provided proper ratio of hose length to standpipe height is made and the hose length adjusted.

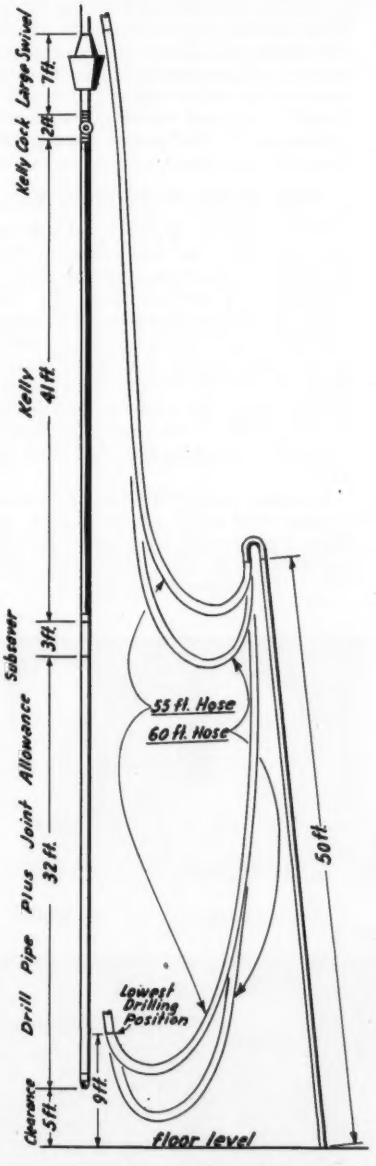



*Fig. 1—Drawing showing relationship between an 85-ft. tool string length, a 50-ft. standpipe height, and 55 and 60-ft. rotary-hose lengths.*

There is a possibility of prematurely destroying the hose at the standpipe end when the hose and/or the standpipe is too short. Conversely, at the swivel end when the hose is too short and/or the standpipe too high. When mouse-hole connections are being made, the relationship has to take the entire tool string into consideration, i.e. swivel, kelly stop cock, kelly, etc. . . . and one length of drill pipe.

In order to reduce the relationship into simple concrete terms, based upon numerous data collected from experienced oil-field personnel, Fig. 1 is offered. Sufficient allowances have been incorporated in order that simplified relationship will hold true for all standard tower drilling rigs employing mouse-hole connections.

**Rule 1.** Standpipe height

$$= \frac{\text{tool string length} + 15 \text{ ft.}}{2}$$

**Rule 2.** Rotary hose length = standpipe height + 10 ft.

For standard tower rigs employing rat-hole connections only, Rule 2 alone will suffice.

Fig. 1 represents a size 18A derrick employing tool string length of 85 ft. Using Rule 1, the standpipe height needed is 50 ft. (height = 85 ft. +15/2 = 50 ft.). Rule 2, the rotary-hose length is 60 ft. (length = 50 ft.+ 10 ft. = 60 ft.). For contrast, both 55 ft. and 60 ft. lengths are shown at the two extremes of swivel height. Note that the 60-ft. hose shows a more gradual swing or drape than does the 55-ft., thus assuring freedom from kinking at either end. The 55-ft. hose, on the other hand, is already in a tight arc, especially at the standpipe end. Not only would the hose give a shorter period of service in such an installation, but there is no safety factor allowed in case of excessive travel of the travelling block. In any eventuality, there is a possibility of 55-ft. hose failure off the end of the built-in coupling.

In order to compensate for the strains placed in flexible hose ends, rotary hose is constructed with built-in reinforcements at the ends. The purpose of these reinforcements is to distribute the stresses away from the nipples and back into the hose proper. This does cause some stiffening which is necessary and should be considered. It has been determined that 10 ft. is the best average to consider when compensating for both the diagonal distance between standpipe-swivel ends and built-in hose

*(Continued on page 91)*

*U. S. Rubber Co.

# Sohio Establishes Separate Division to Handle Water-Flood Operations

## 5,000 Bbl. Daily of Production Involved

***by Leigh S. McCaslin, Jr.***

IN the first such action to be taken by a major oil company, Sohio Petroleum Co. has set up a new water-flood division which is under the general direction of its production department, but separate from other oil producing activities.

Seventy-five Felmont Corp. employes, who joined Sohio when it took over operation of Felmont properties on November 1, 1947, form the nucleus of the water-flood division. Foster M. Pyle, former Felmont executive, is manager of the division which will operate under the over-all direction of R. W. French, vice president of Sohio. Pyle will maintain his headquarters in Oklahoma City and operating offices have been set up at Centralia, Ill., and Paola, Kans.

The new water-flood division is set up to "investigate, acquire, engineer, and operate all Sohio secondary-recovery programs wherever they occur." Sohio's three major geographic divisions within the production department — Western, Mid-Continent, and Eastern—will continue to have charge of normal oil production operations in their respective territories.

In taking over Felmont Corp., Sohio obtained the following properties: 45 producing leases with 1,100 productive acres and 164 oil wells in Illinois; 31 producing leases with 735 productive acres and 266 oil wells in eastern Kansas; 2 producing leases with 400 productive acres and 6 oil wells in West Texas; and 10,000 acres of wildcat leases in Oklahoma, Texas, Mississippi, and Illinois.

### Three Major Floods Under Way

Three major water-flood projects are currently in operation on these Felmont properties—Patoka field in Illinois, and Bolton and Big Lake fields in eastern Kansas. (See adjoining statistical "briefs" on these fields.) In addition, Sohio is making plans to flood the Rosiclare and Stein sands in Patoka field, the undeveloped portion of Big Lake field, and the Benoist reservoir in Centralia field of Illinois.

Looking toward the future, the new section will study all of Sohio's producing properties to determine which reservoirs can and should be water

*(Continued on page 91)*

**PATOKA FIELD — 15 MILES NORTH OF CENTRALIA— MARION COUNTY, ILLINOIS**

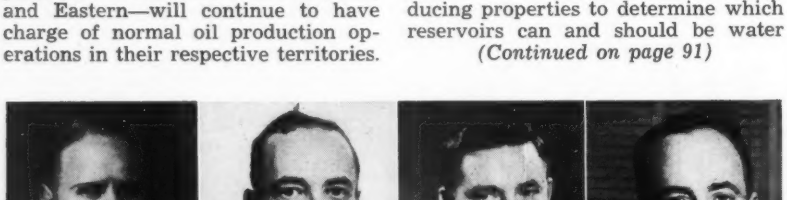
**Year of discovery—1937**
**No. productive acres—700 (550 under flood)**
**No. oil wells—100 (75 under flood)**
**Pays:**
**Stein at 1,275 ft. avg. depth**
**Benoist at 1,410 ft. avg. depth (zone under flood)**
**Rosiclare at 1,575 ft. avg. depth**
**Flood pattern—660 ft. 5-spot**
**Input-water source—Tar Springs sand at 1,000-1,100 ft.**
**Present water input—9,000 bbl. per day**

**BIG LAKE FIELD—12 MILES NORTHEAST OF PAOLA— MIAMI COUNTY, KANSAS**

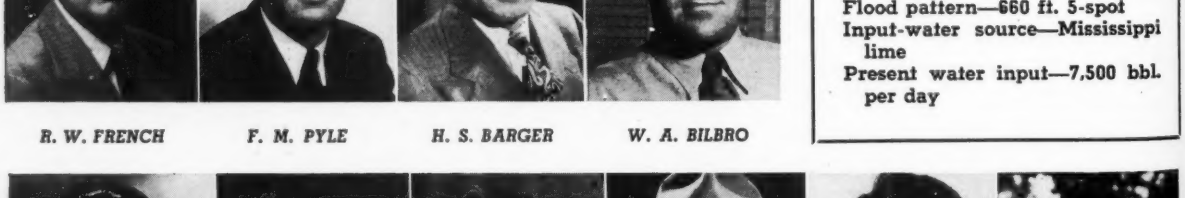
**Year of discovery—1926**
**No. of productive acres — 410 (110 under flood)**
**No. of oil wells—196 (57 under flood)**
**Pays—Peru at 375 ft. avg. depth**
**Flood pattern—330 ft. 5-spot**
**Input-water source—Mississippi lime**
**Present water input—2,500 bbl. per day**

**BOLTON FIELD — 5 MILES SOUTHWEST OF INDEPENDENCE, MONTGOMERY COUNTY, KANSAS**

**Year of discovery—1903**
**No. productive acres—325**
**No. oil wells—38**
**Pays—Bartlesville at 1,200 ft. avg. depth**
**Flood pattern—660 ft. 5-spot**
**Input-water source—Mississippi lime**
**Present water input—7,500 bbl. per day**



*R. W. FRENCH* *F. M. PYLE* *H. S. BARGER* *W. A. BILBRO*



*P. G. LUCKHARDT* *S. D. CASTNER* *K. P. HUFFMAN* *C. E. ARMSTRONG* *T. F. LAWRY* *E. A. WHITWORTH*

# Back-Pressure Test

## FOR NATURAL-GAS WELLS—STATE OF TEXAS

***by Sol Smith***

WITH the drilling of high-pressure gas wells and those wells producing large amounts of condensate, various problems in gas-potential calculations have arisen and it is the purpose of this paper to outline the approved method used by the engineering department of the Railroad Commission of Texas in testing all types of gas wells in order that the testing procedure in the state may be standardized and to enable the gas operators to become familiar with the methods employed by the commission.

As pointed out in U. S. Bureau of Mines Monograph 7[1], the calculations of a back-pressure test may be made to give the ability of the sand to produce gas or of the ability of the well to produce into the atmosphere or against any given line pressure. Where the potential of a gas well is used in a proration formula, it becomes important to know that the back-pressure test was conducted in a correct manner and that the calculations were made according to the approved method of the commission.

It has been found in wells producing through the annulus, that the frictional resistance in this annular space between the two strings of pipe is high, and that up to the present time, a satisfactory method has not been developed for calculating this pressure drop enabling the engineer to convert the well-head pressure back to the sand-face pressure. This is due to the fact that the tubing string does not rest in the center of the casing string and that the collars on the inner string produce a marked turbulance which at the present has not been evaluated.

It has been pointed out in more recent papers on back-pressure testing of natural-gas wells that the following rules should be complied with in order to arrive at a good potential test:

1. Well bore must be cleaned.
2. Pressure in the reservoir in the vicinity of the well should be stabilized.
3. The well should be shut in for at least a period of 24 hours.
4. All pressures should be taken with a dead-weight gage.
5. The well should be produced at high back pressures and after flowing has stabilized, observation should be made of working pressure at the well head and the rate of delivery.
6. At least three points must be taken in order to draw a true back-pressure curve and if possible four points should be calculated.

### Logarithmic Plot

It has been found that when rates of flow are plotted on logarithmic paper against corresponding values for a difference of squares of absolute shut-in pressure in the formation and the square of absolute working pressure at the sand face that these points form a straight line which is expressed by the formula:

$$Q = C\ (P_f^2 - P_s^2)^n$$

Where:

- $Q$ = rate of flow, M.c.f. per 24 hours.
- $C$ = coefficient which is characteristic of the well.
- $P_f$ = shut-in formation pressure, psia.
- $P_s$ = working pressure at sand face, psia.
- $n$ = exponent which is characteristic of the well.

It was brought out in the 1939 pamphlet of the commission on back-pressure well testing[2] that the "critical flow" prover is adjustable to a wide range of pressure and flow conditions and that two sizes of provers, namely the 2 and 4 in., are commonly used. Under conditions of critical flow, the velocity of the gas has reached a maximum and remains constant. The delivery rate does not change under critical flow as long as the upstream pressure stays the same, regardless of the change in the downstream pressure. Monograph 7 stated that critical flow exists when natural gas flows through a small straight-edged orifice having a diameter of less than 0.6 that of the pipe diameter when the ratio of the downstream pressure to the upstream pressure is less than 0.56 to 0.58, varying with conditions. For example, if the pressure of the gas on the upstream side of an orifice is 3,000 psi., the downstream pressure may vary between atmospheric pressure and 1,680 lb., with critical flow remaining throughout, and without changing the rate of flow.

The formula that has been calculated for establishing rates of flow

**The author is senior engineer in charge of all engineering work in the natural-gas department, Texas Railroad Commission, Oil and Gas Division. He previously had been with Magnolia Petroleum Co. as district engineer in the Texas Gulf Coast. For 3 years during the war he was in the Chemical Warfare Service. He obtained the degree of master of science in chemical engineering from University of Texas in 1937, minoring in petroleum engineering.**

of gas through an orifice under critical conditions, is as follows:

$$Q = C\,P_{pw} \times F_{tf} \times F_g$$

Where:

- $Q$ = rate of flow, M.c.f. per 24 hours
- $C$ = coefficient.
- $P_{pw}$ = upstream pressure on prover, psia.
- $F_{tf}$ = flowing temperature factor.
- $F_g$ = gravity factor

The test procedure for establishing a back-pressure curve on a natural-gas well by the use of a critical-flow prover is briefly outlined below:

1. Take the dead-weight shut-in surface pressure on the well head.
2. Install critical flow prover on well head and if possible in a vertical position.
3. Install first orifice plate in prover and select correct-sized plate to give the desired pressure drop for the first point.
4. Place thermometer in thermometer well of prover.
5. Open the valve of the gas well to allow full flow of gas to pass into prover.
6. Check pressure on prover with dead-weight gage at equal intervals and record pressure readings.
7. When two readings over a period of 15 minutes are within 0.1 lb., the pressure and rate of flow have stabilized.
8. Take stabilized pressure readings on prover at well head and also temperature readings.
9. Shut well in and install a larger orifice plate in prover, and open well to atmosphere.
10. Continue this procedure until at least four sets of stabilized readings have been obtained.

When a gas well is flowing either

into a pipe line or to the atmosphere, the pressure at the sand face, $P_s$, is equal to the absolute working pressure on the producing string at the well head, $P_w$, plus the pressure due to the weight of the column of flowing gas in the well bore, plus the pressure drop between the sand face and the well head which is due to friction. A method was devised by J. William Ferguson[3] for making a direct conversion of the well-head pressure squared to obtain the square of the working pressure at the formation. This formula is stated as follows:

$$P_s^2 = P_w^2 \times e^s + R^2$$

Where:

$P_s^2$ = absolute working pressure at sand face, squared.
$P_w^2$ = absolute working pressure at well head, squared.
$e^s$ = a factor for evaluating the effect of the weight of the column of gas on the well-head pressure.
$R^2$ = a factor for evaluating the effect of friction on well-head pressure.

The $e^s$ values are a function of GL (gravity of gas times average producing length) and remain constant as long as GL does.

The value of $R^2$ is obtained from $R = Q \times F_q$

Where:

Q = rate of flow in million cubic feet per day
$F_q$ = a factor for determining R

$F_q$ is a function of GL and the diameter of the flow string and remains constant.

When a well is shut in and therefore no pressure drop due to friction, $R^2$ is equal to zero. Therefore,

$$P_f^2 = e^s \times P_c^2.$$

Most gas wells today are tested through a pipe line after connection has been made and the well properly cleaned. The test procedure for determining the absolute open flow of a gas well by producing it through a pipe line is briefly outlined below:

1. Break down flange and check diameter of orifice plate in meter run and also check the inside diameter of the meter run.
2. Replace orifice plate so that beveled edge is down stream.
3. Zero the differential pen on the meter.
4. Take shutin well-head pressure with a dead-weight gage.
5. Crack the valve on the downstream side of the meter run until the differential pen moves into the required position for the first reading.
6. When both differential pen and static pen become stable, place dead-weight gage on meter and read the flowing pressure.
7. Read the well-head flowing pressure with the dead-weight gage.
8. Take readings each 15 minutes in order to see if the well has stabilized.
9. Crack the valve on the downstream side of the meter run in order to obtain larger flows and repeat procedure.

The volume of flow, Q, may be calculated by the following formula:

$$Q = \frac{C \sqrt{P_m h_w} \times F_{tf} \times F_g \times 24}{1{,}000}$$

Where:

Q = M.c.f. for 24 hours.
C = coefficient of orifice.
$h_w$ = differential pressure, inches of water.
$P_m$ = static pressure, psia.
$F_{tf}$ = flowing temperature factor.
$F_g$ = gravity factor.

Another means of obtaining the rate of flow of a gas well is to employ choke nipples. These choke nipples are usually used in a gas well when the well has to be vented to the atmosphere and when it is impracticable to use the orifice in a critical flow prover on account of excessive gas pressure or because of the damaging effect of abrasive materials carried in the gas stream. Different size choke nipples will give different rates of flow and the flow into these choke nipples may be calculated as follows:

$$Q = C \times P_{uw} \times F_{tf} \times F_g$$

Where:

Q = Rate of flow, M.c.f. for 24 hours.
C = choke coefficient, M.c.f. 24 hours per pound absolute.
$P_{uw}$ = upstream pressure on choke, psia.
$F_{tf}$ = flow temperature factor.
$F_g$ = gravity factor.

In a paper written by A. L. Vitter, Jr.[4], in 1942 it was pointed out that the general flow formula, previously mentioned, applies only to the steady state wherein a gas well has stabilized. He points out that a well has become stabilized when both the rate of flow and the well pressures become and remain constant and it is also necessary for the reservoir itself to become stable. A well without any fluid will itself stabilize within the tubing in a few minutes. However, if liquid is produced along with the gas, as is the case in condensate fields, this liquid will tend to be raised to the surface by the gas. In the event that the well is not flowing hard enough, the liquid will not be lifted except in erratic slugs and thus stabilizations will be prevented.

Vitter points out that there is a certain minimum rate of flow below which a gas condensate well will not stabilize and he finds that in most wells with 2½-in. tubing that this minimum rate is at least 3,000 M.c.f. per day. Wells with tubing that has been set high above the producing formation are prone to stabilize slowly and in some cases it may take several days before rates of flow will become stabilized. Factors that should be noted for the presence or absence of stabilization are as follows:

1. Rate of flow and well-head pressures should be noted every 15 minutes.
2. If possible, the gas-oil ratio should be determined every 15 minutes. This may be done by timing the interval in which the separator dumps or the use of a calibrated glass gage on the separator.

If all of these become and remain constant, then we have stabilization. Observations at longer intervals than 15-minute period can be misleading and give erroneous results.

It would be very desirable to run a bottom-hole-pressure bomb to determine the actual sand face pressures thereby eliminating the calculations of pressure drops due to friction. It has been found, however, that there are certain disadvantages in using the bottom-hole-pressure bomb, namely, that the tubing bends in dually completed wells because of the pressure applied on the packer. The bomb may go down easily but at times it will be difficult or impossible to pull the bomb back out of the well with a wire line. It is also possible that the bomb may be shot up the tubing at high rates of flow.

In Vitter's paper the calculations of sand-face pressures from well head pressures involves the consideration of the weight of the gas-condensate column and the pressure drop due to the flow of gas. The weight of the column is calculated by means of the theorem of reduced states which is based upon the pseudocritical temperatures and pressures and compressibility. The pressure drop due to flow is calculated according to Miller.

Humble Oil & Refining Co.[5] issued a pamphlet in August 1943 on back-pressure tests of gas wells in which it is stated that the ability of a well to produce is chiefly determined upon the ability of the gas to migrate from the formation into the well bore through the screen or perforations. Such a flow of gas causes a pressure drop in the formation which is reflected through the well bore to the well head. Four sets of data are taken by the Humble method because of the possibility of having one or even two poor tests and thereby not being able to properly interpret the wells potential.

Gas wells due to methods of completion can be divided into two classes: (1) Where tubing hangs loosely within the casing, and (2) where the tubing is packed off from the casing.

The compressibility factor may be calculated using the subsurface hydrocarbon analysis of the well and employing the method of pseudocritical temperatures and pressures. This factor is necessary because it is used to correct the specific gravity of the well gas to what it would actually be under extremely high pressures in the reservoir.

It is absolutely necessary that a dead-weight gage be used in taking

all surface pressures. It has been found that some wells will exhibit only a very small pressure drop at moderate flow rates and extreme accuracy in measurement is essential.

It has been brought out in this paper that Monograph 7 calculates the friction drop factor, R, from Weymouth's formula which is not of the degree of exactness necessary for potential test calculations on high pressure gas-condensate wells. For this reason, actual pressure-drop readings have been obtained on 2 and 2½-in. tubing and these data have been correlated and plotted on a curve.

During 1944[6], the Bureau of Mines expanded on Monograph 7 to see how its previous calculations would apply to high-pressure gas-condensate wells having large open flows. It was found that some deep wells capable of producing large volumes of gas indicated that pressures of the face of the sand were not reduced materially when the well was allowed to flow at the minimum rate at which gas could be withdrawn and measured. It was pointed out that sources of error in back-pressure tests of high-pressure wells was brought about due to the presence of liquids and to the incorrect bottom-hole pressure-temperature assumptions and to the fact that the composition and specific gravity of gas flowing from underground reservoirs undergo great changes under different conditions of well operations in deep fields. It was also pointed out that the use of the bottom-hole - pressure bomb would possibly give the correct sand-face conditions if there was fluid present in the well. But it has been found that the bottom-hole-pressure bomb may be in error due to some mechanical conditions thereby giving inaccurate data and misleading interpretations.

According to Muskat and Botset[7], limiting values for the factor n in the equation of flow of gas range from 2 for wholly turbulent flow to 1 for wholly viscous flow.

Limiting values of n under ideal conditions are 0.5 for turbulent flow and 1 for viscous flow.

Of the 582 gas wells tested by the Bureau of Mines and recorded in its Monograph 7, the slope of the curves for these tests ranges from 0.6 to 1.2 with a weighted average slope of .85.

### Rates of Withdrawals

Rates of gas withdrawals from many large gas wells are restricted to relatively small proportions of their absolute open-flow volumes by the small tubing strings, small-size opening in well-head fittings, heater, meter, and separator installations. Therefore, a large well cannot be produced at times at a high rate of flow. It has been found that a relatively small error in pressures at the face of the producing sand can change the value of the slope of the relationship of 0.8 to 1.13. This particular test, when using the incorrect pressure figures, changes the absolute open flow from 240,000 to 760,000 M.c.f. due to a discrepency of only 5 lb. It was shown that this basic discrepency was brought about due to the change of fluid in the well that built up due to unstable conditions in testing. It is therefore necessary to obtain test data over a wide range of operating pressure, if absolute open-flow delivery rates of large high-pressure gas wells are to be determined.

In a paper by Vernon B. Bottoms[8] it was pointed out that several steps are necessary in order to obtain a good test by the back-pressure method. In the first place, a well should be cleaned of its liquid accumulation and then shut in for a period of at least 24 hours. In testing the well, the sequence should be from the low rate of flow to the high rate of flow. In dealing with high-pressure gas, the deviation from Boyle's law should be taken into account. It has been found that Weymouth's formula gives too high a value to the pressure drop due to friction in the producing string, and the new formula used by Bottoms is an improvement over Weymouth's formula giving much better results. He has drawn up an alignment chart whereby the friction drop may be read opposite any rate of flow.

In recent years, it has been generally accepted by the gas industry that a back-pressure curve with a slope in excess of one, is the result of an erroneous test. In Oklahoma, a test is not accepted that does not have a slope of 0.9 or less. There are several factors which tend to flatten the slope of the curve on a back-pressure test. Namely, that the data are incorrect due to the physical condition of the well; that there may be liquid in the well bore; liquid in the sand which was cleaned out gradually and that the calculation of the pressure drop due to friction was too high. It is very advisable in the event complete stabilization cannot be obtained, that each rate of flow is allowed to produce the same length of time in order that the same degree of stabilization may be reached for each point on the back-pressure curve.

In order to obtain as accurate a test as possible, it is advisable to keep the following points in mind:

1. Have well cleaned of any fluid before starting test.
2. Measure well-head pressure accordingly with a dead-weight gage during test.
3. Produce well at rates large enough to prevent accumulation of liquids in well bore during test.
4. Begin test at the lowest rate of the series and proceed to the highest.
5. Calculate pressure drop due to friction correctly.
6. If possible, lower well-head flowing pressure at least 25 per cent below static shutin pressure.
7. Produce the same length of time on each production rate.
8. In the event the slope of the curve is greater than 1, retest well.

In a paper by Elmer Capshaw[9], he states that if a gas well is not tubed, it is necessary for high rates of flow be used in order to attain sufficient velocity to carry out the liquids in the well bore. When shutin pressures are taken on dually completed wells it is best to have all sands shut in in order that the temperature and pressure of the string will not be altered by a flowing condition through the other string.

On a four-point method, each rate of flow should be at least 2 hours in length and no flow should be shorter than the preceding one. Capshaw also states that the sequence of the flow should be from the low flow to the high flow and that a reverse sequence usually gives a flatter slope. This is explained due to the shift in relative stabilization of flow causing liquids to drop out after high rates of flow and in turn causes lower corresponding pressures. In the event four rates of flow are taken on any given gas well in order to determine its absolute open flow potential and no three points align themselves through which a curve can be drawn, it is best to use the top two points in determining the back-pressure curve.

One of the most recent papers written on this subject by C. W. Binckley[10] deals with open-flow and back-pressure data and their application to the production of natural gas with particular reference to Hugoton field. He states that because back-pressure technique established for one field does not have universal application it becomes necessary to make studies in any new area in order to determine the performance characteristics of the area and its individual wells.

Binckley states that the increasing flow sequence is the normal sequence and the decreasing flow sequence is the abnormal one. Each rate of flow and its corresponding working pressure constitute the necessary observations for the determination of the "data point," for the back-pressure plot. The data point itself consists of a rate-of-flow and the corresponding difference between the squares of the calculated bottom-hole, shutin, and working pressures. It is necessary to take well-head working pressures several times each hour so that the pressure-stabilizing characteristics of a well can be determined.

Binckley states that rate of flow is said to have stabilized when the working pressure does not vary more than 0.2 lb. during a 1-hour period and not more than 0.1 lb. during a ½-hour period. The range of testing should be from 95 to 75 per cent of the shutin sand-face pressure. For example, if a gas well has a shutin sand-face pressure of 2,800 lb., the range of testing therefore should be between 2,660 and 2,100 lb. Keeping the testing range within these limits will tend to eliminate large errors in absolute potentials and operating

data which are caused by unavoidable errors in calculating bottom-hole pressures. It is preferable to continue each rate of flow until satisfactory stabilization is accomplished; however, constant time periods for each flow may be established after sufficient back-pressure data are available for an area to determine the duration of flow necessary to bring about satisfactory stabilization requiriments.

An explanation of the significance of the C factor in the general equation for the flow of gas from a gas well is given by Binckley. This factor is influenced by the effective thickness and permeability of the producing formation, the resultant effect of streamline and turbulent flows of gas to the well bore, the magnitude of the drainage radius, the effective diameter of the well bore, and the physical characteristics of the gas. The value n is influenced by the type of gas flow through the formation to the well bore. For steady-state isothermal flow in a system of constant effective permeability the value of n is 0.5 for complete turbulent flow and 1.0 for complete streamline flow. It has been found that most wells in the Mid-Continent area have values within the above-mentioned range. It is pointed out that 80 per cent of the wells tested by the Bureau of Mines and tabulated in its Monograph 7 have an n value within this range.

In the absence of a change in liquid saturation of the sand during a test, an n value outside the range of 0.5 to 1.0 is incorrect and upon a critical investigation of a retest errors can be located.

### The Term "Deliverability"

In the last few years, the term "deliverability" has come into common usage within the industry. The deliverability of a natural-gas well may be defined as the ability of the well to produce gas into a pipe line expressed as a daily rate of flow and is determined by a measurement of the flow at the end of some given period, during which the well continually produces gas into a pipe line at a given pressure.

In Hugoton field of Kansas and Oklahoma, the deliverability standard pressure is 80 per cent of the average 72-hour shut-in well-head pressure of all the gas wells in the field. In these two states, the deliverability of a gas well is used as a factor in the allocation of gas production among the wells in a common reservoir. It has been found that deliverability is a true forecast of the ability of a well to produce under a given pipe-line pressure and assists in the interpretation of back-pressure data in calculating reservoir performance.

In a paper by Elenbaas and Katz[11] it was brought out that although laminar flow exists in the producing formation of gas wells under normal flow rates, turbulent flow does take place adjacent to the well bore. As the flow rate is increased, turbulent flow exists further and further into the producing formation and under open flow conditions in relatively deep wells, a considerable portion of the flow into the sand will be turbulent.

### Radial Flow

By making the assumption of average viscosity, temperature, and compressibility factor of the flowing gas, it was possible for the above-mentioned authors graphically to integrate the relation for the general case of radial flow of gases into the porous sand of a gas well. A radial-flow formula has been developed which permits the computation of the pressure drop due to friction when the flow is in the laminar, transition, or completely turbulent region. By making a series of computations using this new formula at various rates of flow a complete back-pressure curve can be determined. It has been found that this curve is not a straight line, as is the case in a usual back-pressure test but bends upwards in the range of the higher rates of flow. It is the opinion of Elenbaas and Katz that no back-pressure test would give a straight line if a wide enough range of rates of flow was used in obtaining the test data.

The following general rules have been accepted by the commission as the approved method for testing natural-gas wells by the back-pressure method in Texas. These rules shall be followed in order that tests will be accepted by the engineering department of the commission and to eliminate extra work on the part of both the operators and the commission necessitated by retesting and recalculating results.

1. If well has a pipe-line connection, it should be produced at an average daily rate for 24 hours prior to the shut-in period in which the buildup pressure is obtained.

2. The well should be shut in for a period of 24 hours before the testing begins.

3. The shut-in pressure at the well head should be taken with a dead-weight gage.

4. All pressure readings whether shut in or flowing should be taken with a dead-weight gage since spring-gage readings cannot be relied upon to be accurate enough for back-pressure tests.

5. Produce the well at its first rate which should be great enough to lift the fluid in the well bore.

6. Begin the test at the lowest rate of flow and proceed to the highest rate of flow.

7. If at all possible, lower the well-head flowing pressure at least 25 per cent below the shut-in well-head pressure. In some cases it may be necessary to produce only one well into a pipe line to arrive at this per cent drop.

8. Check the diameter of the orifice plate in the meter run and also check the inside diameter of the run.

9. The differential pen on the meter should be zeroed.

10. Take pressure readings on the well head every 15 minutes in order to determine if the well has reached stabilization.

11. Where a gas well is producing liquid, the gas-liquid ratio should be arrived at from time to time to determine whether or not this ratio remains constant.

12. Under flow conditions, the pressures will be considered stabilized when they do not vary more than 0.1 psi. during a 15-minute interval.

13. In the event stabilization, as described above, cannot be reached, each rate of flow should be limited to a period of 4 hours.

14. At least four rates of flow and four corresponding stabilized pressures shall be taken on each test in order that a back-pressure curve may be drawn through at least three points.

15. Correct values for compressibility and friction factors should be used in determining the absolute open flow of gas wells.

16. A back-pressure curve with a slope in excess of one will not be accepted by the commission. When this occurs, the well should be retested to determine whether or not more accurate results can be obtained.

17. Upon retesting, if the points do not align themselves to give a good curve as outlined above, then a line with a slope of 1 should be drawn through the point determined by the highest rate of flow, and the absolute open flow potential of the gas well should be ascertained from this curve.

18. All necessary data required for calculation of the test should be available in order that these calculations may be made in the field as the test progresses. This procedure will eliminate extra work in the event misleading or incorrect data are obtained.

19. Upon completion of the test, all calculations should be shown on Railroad Commission Form GWT-1 and shall be accompanied by a back-pressure curve on log-log graph paper. Two copies of data sheets together with back-pressure curves should be mailed to the commission district office in which the gas well is located.

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# Socony-Vacuum Uses "Time Towers" in Gasoline Treating

**by R. B. Tuttle**

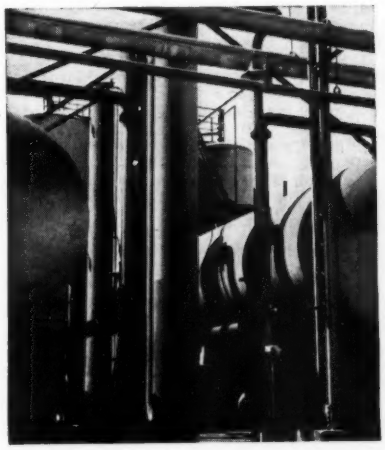
A SIMPLE but effective method for controlling the added-sulfur content of doctor-treated gasoline is employed in the East St. Louis, Ill., refinery of Socony-Vacuum Oil Co., Inc. Devised by the refinery's treating-department manager, L. L. Ferguson, the method permits maximum efficiency for doctor solution and eliminates time-consuming test procedures.

Employed in a continuous treating system, slightly revised from the conventional type, the control method consists essentially of operator adjustment to the sulfur-oil stream as indicated by simple stream tests at three points in the process. In general the treating system, in which the method is used, employs delayed contact or "time towers" and conventional Duriron mixers. Unlike the standard hookup at the two mixers installed in the prewashed gasoline feed line, the sulfur-oil mixture is introduced into the stream between the first and second mixer units. Doctor solution and air lines are connected ahead of the first mixer. The schematic flow diagram of the treater shown here indicates the relative locations of the chemicals and air feed lines.

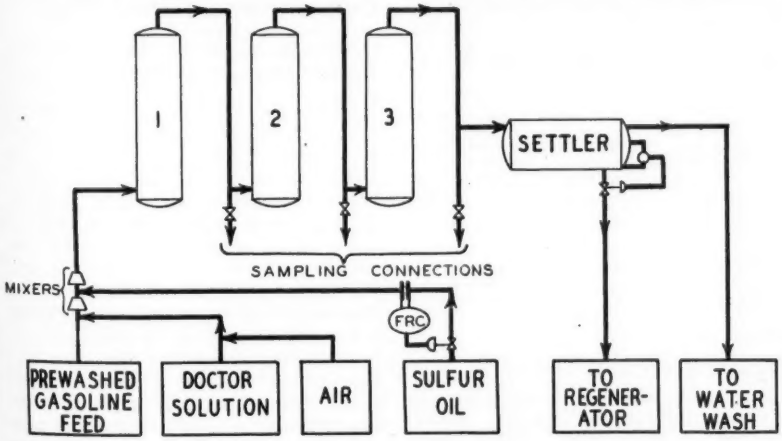
When charging rate to the treater is in excess of its design rate, 5,500 bbl. per day, prewash caustic circulation is discontinued. Caustic prewash solution averages approximately 15° Baume'. Ratio of the raw-gasoline-to-caustic streams and the equipment involved are conventional.

Free flow area in the three delayed-contact towers is approximately nine times greater than that of the feed line to them. These towers or columns, 2 by 20 ft., are located in the refinery's treating area adjacent to other equipment and require little space as indicated by the accompanying photograph of the layout. Spent doctor solution is separated from the oil stream in the horizontal vessel shown to the right in the photograph.

The gasoline is sweetened progressively in the three towers. Regulation of the degree of delayed sweetening in each stage is important; hence the sampling connections on the outlets of the towers as shown in the diagram for checking on added sulfur. Proper regulation prevents lead sulfide carryover of gasoline leaving the doctor-solution settler. Added-sulfur flow is regulated by a controller by resetting its control rate as desired. Minimum sulfur oil flow is required in obtaining the desired end results.



*The plant's three time towers*




*Flow arrangement of gasoline-treating plant*

To obtain sweet gasoline having a good, clear "break," operations of the treater are directed toward maintaining intertower conditions as follows:

| Outlet of tower | Doctor test | Break |
|---|---|---|
| 1 | Sour | None to poor |
| 2 | Slightly sour | Poor to fair |
| 3 | Sweet | Clear, in less than 10 min. |

Where operations can be carried out with a 20-minutes or even a 30-minute clear break on column-three test and still prevent lead sulfide carryover from the doctor solution settler, superior treatment is obtained. When the effluent of tower one is only slightly sweet to sour and the break is fair, whereas that of tower two shows a quick break and tests sweet, too much sulfur is indicated. When the sulfur oil flow cannot be reduced to meet test indications, one or more of the following conditions may exist:

1. Sulfur supply depleted.
2. Litharge content of doctor solution low.
3. Insufficient caustic soda in doctor solution.
4. Insufficient volume of doctor solution entering treater.

As sulfur content of the sulfur-oil solution increases, its flow to the system should be reduced. Concentration of the sulfur in the sulfur-oil solution increases when:

1. Temperature of dissolving gasoline is increased. (S. R. gasoline at 108° F. will dissolve twice as much sulfur as at 79° F.)
2. Flow rate of the dissolving oil is reduced.
3. Quantity of sulfur in dissolving vessel is increased.

Two other settlers, not indicated in the diagram, are connected into the system. Any lead sulfide or doctor solution which is not settled out in the first of these two vessels is washed out of the stream with wash mixers before it enters the last settler. Lead sulfide settlings and emulsion gatherings are drawn off at regular intervals. Sufficient water is supplied to the wash mixers to maintain the gasoline temperature below 100° F.

The necessity for corrosion tests by the butyl mercaptan method has been greatly reduced. Accurate sulfur control in the operation of the treater is maintained through the use of the time tower tests while the butyl mercaptan test method is used periodically on the gasoline as a check on the condition of the treating solution. Testing time with butyl mercaptan runs to a minimum of 60 minutes for the treating procedure outlined here. If the test runs to less than 1 hour, sulfur control is considered unsatisfactory.

# QUESTIONS on TECHNOLOGY

*by W. L. Nelson*

Consulting Engineer

## Turbine or Jet Fuels

**Do you know of any paper on jet-fuel specifications and can you direct me to references in general?—E. R.**

Some confusion exists concerning just what is meant by "jet" fuel. There are two general types of newly developed engines that involve the jet principle. The most widely known engine is a combination gas turbine and jet engine and it is thought that substantially all the literature and current interest pertains to this type of engine. The second or rocket type of jet engine sometimes described as a ram jet or pulse jet or rocket jet engine or machine is primarily a military development which is not mentioned much in current literature.

About the only comprehensive paper on the fuels used in gas-turbine-type engines is that of H. A. Murray presented before the Texas Mid-Continent Oil and Gas Association at San Antonio, October 17, 1947 *(Jet Fuels for Aircraft, The Oil and Gas Journal, January 8, 1948, page 53)*. This paper refers to an earlier paper by C. R. Johnson, "An Analysis of Aviation Turbine Fuel Performance Factors Affecting the Design and Operation of Commercial Aircraft (A.S.M.E. meeting, Los Angeles, May 28, 1947), and to a paper by C. G. Williams presented before a joint meeting at London, England, of the Institute of Petroleum and the Royal Aeronautical Society on February 12, 1947.

The National Bureau of Standards letter circular LC-872 (gas turbines and jet propulsion) and its supplement No. 1 of January 1948 consist primarily of a 59-page bibliography of books, articles, and publications on gas turbines.

The specification of the JP Army-Navy aeronautical jet fuels are summarized in Table 1, and the 10, 50, and 90 per cent points of these fuels and of five experimental jet fuels reported by H. A. Murray are shown in Table 2.

The references mentioned are the main ones, but general references to gas turbines and jet engines are listed below.

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**TABLE 1—SUMMARY OF MORE IMPORTANT SPECIFICATIONS OF JET FUELS**

| | JP-1 AN-F-32 | JP-2 AN-F-34 | JP-3 (proposed) |
|---|---|---|---|
| Viscosity, kinematic at —40° F. | 10 max. | 10 max. | 10 max. |
| Sulfur, per cent | 0.2 max. | 0.2 max. | 0.5 max. |
| Residue, air jet, mg./100 ml. | 5.0 max. | 5.0 max. | 10 max. |
| Gum, accelerated, mg./100 ml. in 7 hrs. | 8.0 max. | 8.0 max. | *20 max. |
| Bromine No. | 3.0 max. | 3.0 max. | 14 max. |
| Reid vapor pressure | ... | 2.0 max. | 5-7 |
| Distillation, temp., °F.: | | | |
| 10 per cent | 410 max. evap. | †150 min. | ... |
| 90 per cent | 490 max. evap. | ... | 425 min. |
| End point | 572 max. | 500 max. | 600 max. |

*In 16 hours; not 7 hours. †I.b.p. not 10 per cent point.

**TABLE 2—APPROXIMATE A.S.T.M. TEMPERATURES OF SOME JET FUELS, °F.**

| | JP-1 | JP-2 | JP-3 | Kero. | Gas oil and dist. | Gas oil | Gas oil | Topped crude |
|---|---|---|---|---|---|---|---|---|
| 10 per cent point | 340 | 295 | 170 | 385 | 400 | 495 | 520 | 455 |
| 50 per cent point | 370 | 390 | 325 | 425 | 480 | 530 | 600 | 655 |
| 90 per cent point | 480 | 470 | 480 | 500 | 675 | 615 | 700 | 745 |

## Octane Number Versus Compression Ratio

**What octane number should be marketed under present conditions?—D. F. C.**

This department is unable to give a direct answer even though similar questions have been answered repeatedly. (Note: "Significance of Octane Number," February 3, 1945, page 66; "Power versus Octane Number," November 16, 1946, page 317; and "Octane Number Requirement," February 15, 1947, page 99.) In these answers, tabulations of the percentage of cars that knock when using various octane-number fuels are presented as a function of engine speed. In addition, the fact that actual power output or mileage is little affected by octane number (or knocking) is emphasized.

About all that can be added to these discussions is to point out the general relationship between compression ratio and octane number as indicated in Table 1. Of course, such a relationship can be only approximate because of the many operating conditions that are encountered.

**TABLE 1**
**Octane-Number Requirements of Automobile Engines as an Approximate Function of Compression Ratio**

| Compression ratio | Octane number (motor method) |
|---|---|
| 4.0 | 39 |
| 4.5 | 51 |
| 5.0 | 59 |
| 5.5 | 65 |
| 6.0 | 71 |
| 6.5 | 77 |
| 7.0 | 82 |
| 7.5 | 87 |
| 8.0 | 91 |
| 8.5 | 95 |
| 9.0 | 98 |
| 9.5 | 101 |
| 10.0 | 104 |

## Congealing Point of Wax

**What is meant by the "congealing point" of petroleum waxes?—L. D. S.**

There is probably no formally standardized test for congealing point in United States' practice but the British Institute of Petroleum (Manson House, 26 Portland Place, London, W. 1) has a standard test method.

For many years manufacturers and refiners of wax products have employed a simple test for determining the approximate congealing or melting point of petroleum waxes which involves simply noting the temperature at which molten wax congeals on a thermometer bulb and turns with the bulb as it is rotated. The extreme simplicity of the test, as compared with the A.S.T.M. Methods D87-42

Melting Point of Paraffin Wax, and D127-30 Melting Point of Petrolatum, caused it to be the most widely used method. British test I.P. 76/44 (tentative) entitled, "Congealing Point of Petroleum Waxes," is a refinement of the somewhat crude test mentioned above, but it is still relatively simple and can be applied to either paraffin or petroleum waxes. The procedure is:

"A small quantity of the wax, heated sufficiently to adhere, shall be placed upon the bulb of the thermometer, and shall be cautiously heated until the wax is about 10° F. above its congealing point. The thermometer bulb shall then be inserted into the middle of a small glass bottle or other suitable vessel previously heated to a temperature approximately equal to the congealing point of the wax. The thermometer and jacket shall then be rotated continuously in a horizontal position at a rate of approximately two revolutions in 3 seconds. When the drop of wax is first observed to rotate with the bulb of the thermometer, the temperature shall be noted and recorded as the congealing point."

## Application of Electric Recording Type Meters

*(Continued from page 69)*

wells in the field which operate on time-switch control are tested at least once per year with an inkless recording-type ammeter to insure that the subsurface pump is in good enough repair to pump off the well and obtain capacity production, and also to determine what the correct pumping schedule should be.

In adjusting pumping times under this program, an effort is made to choose running schedules which will balance the load on each field substation and also insure that pump pounding will be limited to only 5 or 10 minutes per period. This margin of safety is provided so that occasional production losses resulting from mechanical downtime might partially be made up, and so that possible declines in pump efficiency will not bring an end to capacity production, although in most cases producing rates decline faster than subsurface pumps wear, so that the percentage of pounding time usually increases above that provided when a new pumping schedule is selected. This fact is responsible for all wells being retested every year when reductions in running time for 10 to 25 per cent can generally be effected.

From time to time, fluid-buildup characteristics of representative wells are also determined so that the proper number of daily pumping periods can be selected. These buildup characteristics are determined by setting the time switch to provide for different periods of downtime, each followed by sufficient pumping time to induce well pounding. After a record is obtained from this method of pumping, a graph can be prepared showing pumping time expected after any preceding downtime interval as illustrated in Fig. 10.

Such characteristic curves indicate that fluid will continue to enter and accumulate in a well bore so long as reservoir pressure exceeds the back pressure of fluid in the hole. However, as fluid builds up in the hole and back pressure increases, the rate of fluid entry into the well bore decreases, and true capacity production of the well will result only if sufficient daily pumping periods are provided to prevent the fluid buildup in the hole from becoming too high during any downtime period.

For the fluid-buildup chart illustrated in Fig. 10, production losses begin when the downtime period exceeds 2½ hours; so the optimum pumping schedule would be 1 hour 3 minutes on and 1 hour 57 minutes off for a total of 3 hours per pumping cycle to give 8 period per day. The schedule which probably would be selected for this well in field practice would involve six pumping periods of 1½ hours each per 24-hour day. This schedule would provide 9 hours per day running time of which 8 hours would be actual pumping and 1 hour would be pounding, since each running period of 1½ hours would include 10 minutes of pounding time.

As the downtime period of 2½ hours on this schedule is the maximum which can be allowed without suffering a production loss, a schedule providing for eight daily pumping periods might better be adopted to allow for future declines in reservoir pressure. If the total running time for 9 hours per day were to be approximately maintained, such an alternate schedule would involve 1 hour 7 minutes on and 1 hour 53 minutes off for 8 minutes of pounding time per running period.

As the reservoir pressure of a field declines, the number of pumping periods required to obtain true capacity production with intermittent operation necessarily increases. However, the capacity of a well also declines with reservoir pressure, so that ultimately this trend is reversed, and the number of pumping periods can again be reduced after a well produces so little oil that no appreciable back pressure results from the accumulation in the shot hole of even a full day's production. Experience has indicated that a maximum of six to eight periods per day is desirable with perhaps two to four pumping periods per day being used during the early and late life stages of a well.

An analysis of oil-production decline curves for low-potential wells pumped on both continuous and intermittent operation for long test intervals indicates that no decrease in production results from intermittent operation, and in a few cases actual increases are indicated by slightly reduced decline rates. It is believed that this condition is not at all improbable and might result generally from slightly higher relative oil permeabilities in sands where pumps are set near total depth and intermittent pumping is employed. Such a permeability increase results from a slightly greater fluid saturation in a sand which is alternately covered with oil and uncovered than exists in a similar quality sand which is continuously uncovered so that gas saturation is greater.

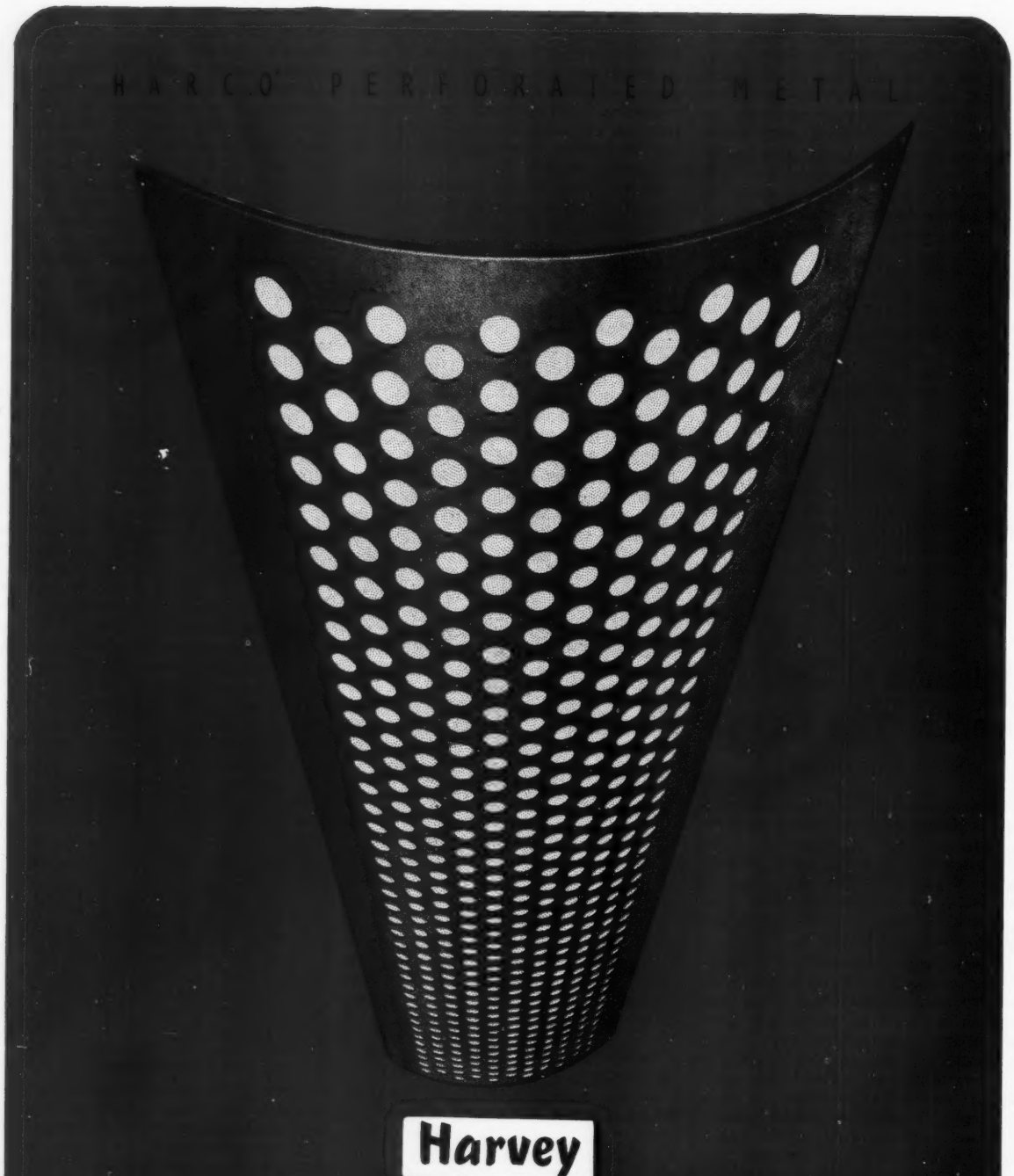
In addition to the general field program of testing all intermittent pumping wells annually, special recording ammeter or wattmeter tests are made whenever deemed advisable at any well which shows evidence of needing servicing, whether electric motor loading, pumping unit balance, or subsurface pump performance appears to be faulty. An analysis of pump performance at numerous wells indicates that volumetric efficiencies of 70 to 90 per cent can be obtained in 1,500-ft. wells. Volumetric efficiencies of 65 per cent have been found to indicate some pump wear, while a drop in volumetric efficiency to 60 per cent or below generally indicates the need of well servicing.

A recording meter check of most wells considered for pulling has eliminated the servicing of some wells which were found to be operating satisfactorily and has also brought about the needed repair of other pumps where servicing had not been contemplated. Reduction of pump pounding time also contributes to decreased maintenance expense for surface pumping units by eliminating the mechanical shock which pounding imposes on both structural members and bearings.

### Conclusions

Efficient handling of an electrified oil-well pumping operation requires complete knowledge of pumping load characteristics, and the proper measurement of such loads necessitates a use of recording-type meters. The pulsating nature of a typical pumping load makes necessary the use of recording meters to provide an accurate history of both average and peak loads as well as degree of load unbalance. The greater accuracy of a wattmeter makes it the preferred instrument for special tests, although the inkless-type recording ammeter is convenient for testing intermittent pumping wells to determine subsurface pump performance because it possesses the advantage of increased portability.

A wattmeter cabinet including a recording-type meter for history of load peaks and an integrating-type

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meter for accuracy of average power demands, together with an indicating-type voltmeter, has been found to provide the best means for measuring power and thermal loading of electrical equipment, while the maintenance of an adequate but relatively uniform loading of such equipment improves distribution system efficiency.

Proper intermitting of pumping wells through use of recording meters not only aids electrical efficiency by reducing total energy requirements but also decreases pumping equipment maintenance costs by restricting pump pounding to a small portion of the total running time, all without any adverse effects upon producing rate.

## Flexible Hose in Rotary Drilling Operations

*(Continued from page 77)*

reinforcements. In brief, where the hose length is 10 ft. longer than the standpipe, mouse-hole connections can be made with safety.

Although it is true that many successful mouse-hole connections have been made using 55-ft. hose length with 45-ft. standpipe, it is a fact that in most cases some precaution has been taken. Usually this is in the form of swivel joints. Any acceptable swivel certainly makes a worthy contribution. They do, however, require constant maintenance and it is doubtful whether their expense is justified when 60-ft. hose can be obtained. Since 60-ft. hose lengths can now be obtained there is no longer any doubt concerning the possibility of keeping a proper standpipe to hose length relationship where making mouse-hole connections.

The reduction of unnecessary strain on the hose ends can further be facilitated by the use of proper gooseneck connections. Previous difficulties led to the A.P.I. adoption of the 15° swivel gooseneck. This proved to be good practice and should be continued. The standpipe elbow is also of importance and although 180° elbows are satisfactory, they should be used with a perpendicular standpipe. Some drillers strap the standpipe to the derrick girts thus actually throwing the standpipe into the same pitch as the derrick. In this case a 160° elbow would be more advantageous.

There have been many instances where hose has been severely damaged and its life shortened by the practice of removal from its crate by pulling with a catline. The hose should be removed from the crate by hand and laid in a straight line. Attachment of the catline can then be made near the hose end and lifted without danger of kinking the hose body. Placement of the safety clamp should be 18 in. or less from the hose ends. The clamp will then be over the nipple proper and danger from excessive tightening removed. Placement of the safety chain should be to an upright, rather than a transverse girt. Should the traveling block inadvertently be allowed to travel too high, the chain being free to move up will not restrict the hose movement. Downward movement of the chain can be restricted by placing on the upright immediately above the point where the transverse girt is attached.

Backtwisting deliberately placed in a hose should be avoided. This practice, usually employed to force the swivel bale out of the way, places undue stresses on the structural members of the hose body. In effect, one spiral of reinforcing wires is opened while the other is tightened thus placing the strains on one set of helices and greatly reducing the resistance of the hose to burst and kinking.

Excessive pressure pulsation can be greatly reduced by the use of suitable surge chambers. There have been instances noted where due to worn parts, the pulsations were so bad that the hose was literally "jumping" in the rig. Obviously, the hose body wires are subjected to an unusual amount of flexing and the hose life is effectively reduced. Most drillers fortunately recognize the value of surge chambers and make a point of keeping them in good operating condition.

Protection of rotary hose during movement to new locations by use of a carrier is recognized by some large operators. This should be standard practice. The placement of heavy equipment on top of the hose should be avoided. The practice of handling hose with a winch and the hanging of the hose from the gin pole of a truck has been the cause of many premature hose failures. Often this results in kinking which may not cause an immediate failure but certainly contributes to shorten hose life.

It is an established fact that following the simple rules and precautions indicated that long and satisfactory service can be obtained from flexible rubber rotary hose. Expensive shutdowns and inconveniences can and are being avoided by those drillers who recognize the tremendous job assigned to rotary hose and take the necessary steps to get the most out of their equipment.

Short length of rotary, usually 8 to 12 ft. long, are finding extensive use for manifold hose to replace rigid pipe. The use of flexible hose makes the setting up of pumps a relatively easy operation since reasonable misalignment can be tolerated. Further, the hose acts effectively as a vibration dampener. Sharp bends and reverse bends such as a figure "S," however, should be avoided. The simple expedient of using a 45° elbow off the discharge side of the pump will often allow the installation to be made in a graceful long sweep. Where the hose shows a serious twist the union connection should be loosened to allow the hose to straighten. The hose is subjected to the same pressures as rotary hose and should be given the same care both as regards installation and maintenance.

Mud-pump suction hose, especially designed to handle the job of reducing vibration and making a flexible connection between the pumps and pits, has done a noteworthy job. Eventual replacement of this hose is usually caused by accidents. It is constructed with at least one rigid wire to prevent collapsing. When crushed slightly in moving location it can be used but its potential life is shortened. In operation the hose should be properly supported with timbers. Shifting of the timbers allowing the hose to support the steel line to the pit will cause nipple cutting of the tube and possible complete rupture of the hose body.

## Sohio Establishes Water-Flood Division

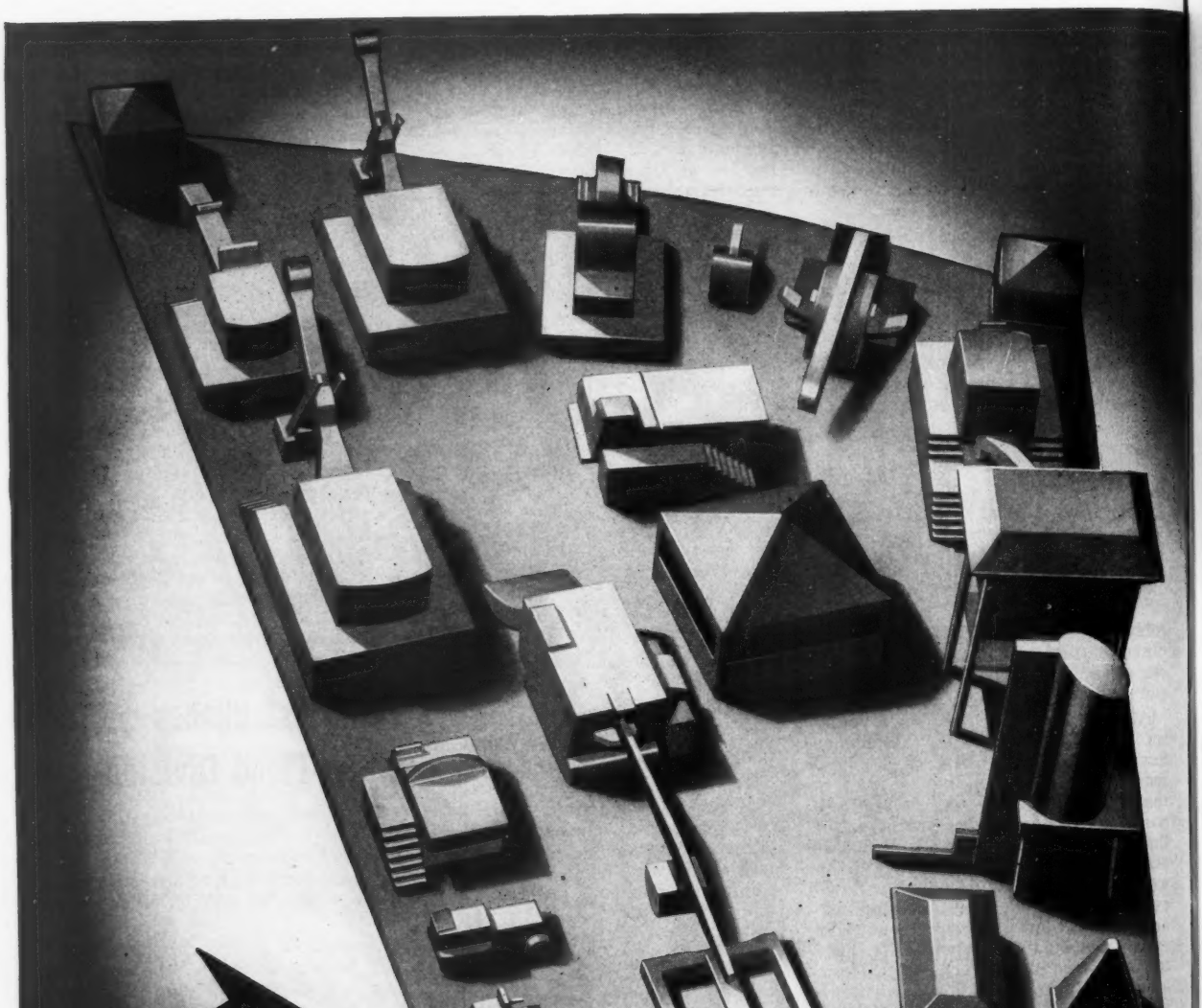
*(Continued from page 78)*

flooded. In addition, likely looking properties owned by other companies or individuals will be investigated if there is any possibility of acquiring them.

In addition to French and Pyle, supervisory personnel for the new division include the following: H. S. Barger, head water-flood engineer, Oklahoma City; W. A. Bilbro, superintendent of Illinois operations, Centralia; J. D. Castner, district engineer in Illinois, Centralia; C. E. Armstrong, superintendent of Kansas operations, Paola; T. F. Lawry, district engineer for Kansas, Independence; Carl R. Temple, petroleum engineer for Kansas, and Earl Whitworth, area engineer for Big Lake field.

Former connections of these men are as follows: Barger, chief engineer, Felmont; Bilbro, assistant superintendent in Illinois, Felmont; Armstrong, Kansas superintendent, Felmont; Lawry, Eureka, Kans., district engineer, Ohio Oil Co.; Whitworth, private consultant; and Castner, chief geologist and petroleum engineer, West Virginia Gas Corp.

Kenneth P. Huffman is petroleum engineer for Sohio in its Kentucky district water-flood operations, and Paul G. Luckhardt is field engineer in their Illinois district. Huffman has returned from a year's leave of absence taken to continue his education at University of Pittsburgh. Luckhardt was formerly with the Illinois Geological Survey.

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# CONTRACT DRILLING

**by A. J. Heiser***

EIGHTY-TWO per cent of the wells drilled in the United States in 1947 were drilled by contractors utilizing equipment worth over $500,000,000[1]. The high percentage of wells being drilled by the contractor proves that the contractor continues to be of economical benefit to the operator. That the contractor can drill wells for the operator and show him a material gain is, in fact, his justification for existence.

It is significant to note that recently several operators have disposed of their drilling rigs and now contract all of their work. Such a trend would not take place if it did not benefit the operator.

### Equipment Owned by Contractors

Contractor-owned equipment is more advanced and better maintained than ever before. It is rigged for fast moves and unitized for simplicity. The contracting industry offers a selection of machinery to the operator to cover any job that may arise. Several of the deepest wells in the world have been drilled by contractors.

As a major buyer and user of drilling equipment, the contracting industry has a definite responsibility to the manufacturer. To design and build equipment that will give the user greater efficiency in his operations, the designer must have ideas and data from the field. The contractor is in an ideal position to help the manufacturer with this, and the two cooperating can unite the theoretical and the practical to produce equipment which will result in more footage for less cost.

The American Association of Oilwell Drilling Contractors sponsors many research projects to aid the individual contractor. The economic setup of the contractor does not permit him to employ a large staff of engineers, but he approaches the same end by cooperating with his competitors to raise the standards of his industry collectively. At the present time, the association is sponsoring an investigation of methods to improve the performance and life of the drill string. This research was instituted in September 1945, and is continuing today with a study on the nondestructive testing of drill pipe.

*Petroleum engineer, Brown Drilling Co., Long Beach, Calif. This article is part of a paper given at the 1948 spring meeting of the A.P.I. production division held at Los Angeles.

The present supervision employed by drilling contractors is far superior to anything we have known in the past. It is a different type of supervision. It is one of varied and complete quantity and high quality.

The majority of modern-day contractors provide 24-hour rig supervision. They hire tool pushers who will be concerned with such things as bit performance, wire-line service, rig maintenance, and safety. They know the importance of drilling-fluid control and utilize mud engineers on their staffs. They employ trained mechanics to eliminate downtime.

The ambition for constant improvement by the drilling contractor in his operations has prompted such ideas as drilling-mud schools and vocational training classes. The mud schools are sponsored by the American Association of Oilwell Drilling Contractors, usually in conjunction with local educational institutions. The classes have been conducted throughout the oil fields of the country and have had remarkable success.

Another factor that helped to effect improved operations on contract rigs was the installation and development of a sound safety program. This program was instituted by A.A.O.D.C. in 1945. The program consists basically of safety meetings at the rig, using different crew members as chairman each time. The program has functioned well and has resulted in reduced absenteeism because of injuries, reduced repair bills, improved morale, better employe and employer relationships, and, of course, more efficient use of the company's equipment. It has also reduced considerably the contractor's compensation insurance and public-liability rates.

It should be emphasized that the advancement in the phases of contracting activity just discussed has been responsible for the contractor's increased speed of drilling. This speed of drilling is enabling him to stay in business. A survey made in October 1947 shows that the contractor's labor costs had gone up 35 per cent since 1941. His equipment costs had increased 30 per cent and his rig operating costs 40 per cent. During this same period, the price per barrel of crude oil had increased 69 per cent, yet for the United States as a whole, the price per foot that the operator paid for the drilling of a well in 1947 was 1 per cent less than the price he paid in 1941. For California, his cost per foot was 2 per cent less.[2]

### Bids by Drilling Contractors

The bid determines the final remuneration that the contractor will receive for his services. It must therefore be a bid that has been developed with the full knowledge of what its conditions cover.

It is impossible to make an intelligent bid without a true knowledge of costs. Much time and effort has been expended in developing accounting procedures which show the contractor clearly and accurately where his money goes. There is no one basic cost-accounting method used by the contracting industry, but most contractors are cost conscious and the majority can demonstrate their costs for each rig by days, by wells, and by areas.

Cost analyses are receiving constant attention and study which is necessary in view of the earlier-stated fact that the price per foot today is practically the same as in 1941. Although true costs are the basic requirement in the development of a bid, there are other important items that the contractor must know in order to bid soundly.

The drilling contractor must know his areas and be able to differentiate classes of work and classes of wells. The contractor will have complete well information including mud records, bit performances, hazardous zones, etc., in areas where he has worked. In a new area the contractor faces a more difficult problem but may, in most cases, receive aid from the operator by checking company-owned records.

Majority of contracts let today are of the bottom-hole or footage type wherein the contractor is paid for each foot of hole he drills. The typical contract of this type releases the contractor from the footage part of the agreement after he has successfully placed the water string in the hole. Therefore, the contractor must estimate at the time he develops his bid how many days he will spend under the footage part of his contract in order to arrive at his total estimated costs. The profit that the contractor anticipates making on a well is nominal in comparison with his total estimated costs. Hence, his anticipated costs must be carefully considered.

Knowledge of true costs is a matter of good accounting procedures, but the risk factor on a well is another matter. There is no possible way of knowing how much time will be consumed fishing, fighting crooked hole, or combating lost circulation.

### References

1. Warren, J. E., Economic Trends in Contract Drilling, paper at 27th annual meeting of A.P.I., Chicago. The Oil and Gas Journal, November 15, 1947, p. 301.
2. World Oil, October 1947, p. 63.

# 10 GOOD REASONS WHY OPERATORS PREFER

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8. **NO LOST TIME.** McCullough's simpler, lighter equipment cuts setting-up and moving-out time, speeds up every job.
9. **EXPERIENCED MEN.** With years of experience behind them, thoroughly-trained McCullough gun-perforating crews do their jobs quickly, efficiently, safely.

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ENGINEERING *fundamentals*

# Reservoir Material-Balance Equation

THE production of petroleum from an underground reservoir as a unit may be considered as a basic operation to which the law of conservation of mass must apply. As with other similar engineering processes, a balance can be made between the materials in the reservoir and those produced. Balances have been derived and explained by many authors.[1,2,3,4] Most of these balances are complexly stated and seem formidable to the initiate. Perhaps the simplest way of stating that the law of conservation of mass must be observed is by the equation:

Weight of hydrocarbons in reservoir originally = weight of hydrocarbons produced + weight of hydrocarbons remaining in reservoir (1)

The term hydrocarbons includes all oil and gas, which quantities can be measured only as residual quantities, i.e., stock-tank oil and standard cubic feet of gas produced. Furthermore, the standard cubic feet of gas produced must be expressed in terms of the stock-tank oil in order to account for the amount of gas in solution. The equation becomes upon expansion:

Wt. S.T. oil and S.C.F. gas originally in reservoir = Wt. S.T. oil and S.C.F. gas produced + Wt. S.T. oil and S.C.F. gas remaining in reservoir (2)

The following is also true:

Wt. S.T. oil originally in reservoir = Wt. S.T. oil produced + Wt. S.T. oil remaining in reservoir (3)

This separate equation is of no value because the S.T. oil produced is the only one of the three terms that can be measured directly. Subtracting this equation from Equation 2 and realizing that volume can be substituted for weights because the gas is stated always as S.C.F., the balance becomes:

S.C.F. of gas originally in reservoir = S.C.F. gas produced + S.C.F. gas remaining in reservoir (4)

This is the basic equation for evaluating the reservoir material balance.

The simplest reservoir for which Equation 4 can be expanded is one which has no free gas cap and in which the pore volume available to hydrocarbons remains constant, i.e., no water encroaches and no water is produced. The definition of certain necessary terms have been made in previous Engineering Fundamentals. These are:

$N$ = the number of barrels of S.T. oil which were originally in the reservoir

$\Delta N$ = the number of barrels of S.T. oil which have been produced up to the time the balance is made.

$r$ = the number of S.C.F. of gas which will dissolve in 1 bbl. of S.T. oil under the pressure P which exists at the time the balance is made.

$r_o$ = the number of S.C.F. of gas which will dissolve in 1 bbl. of S.T. oil under the original reservoir pressure $P_o$.

$\beta$ = the formation volume factor at P, i.e., the volume occupied in the reservoir at P by 1 bbl. of S.T. oil plus the amount of gas, r, in solution.

$\beta_o$ = the formation volume factor at the original pressure $P_o$, i.e., the volume occupied in the reservoir at $P_o$ by 1 bbl. of S.T. oil plus the amount of gas, $r_o$, in solution.

$v$ = the space in barrels occupied in the reservoir at P by one S.C.F. of gas when not in solution, equal to $\frac{Z\ 14.7\ T_r}{5.62\ P\ 520}$ (Eng. Fund. No. 305).

Also, let $V_g$ be the number of S.C.F. of gas produced from the reservoir at the time the balance is made. Then $V_g/\Delta N$ is the gas-oil ratio on a cumulative basis. Let this be represented by $R_c$.

The expansion of Equation 4 in these terms subject to the conditions of no gas cap, no water production and no water encroachment is outlined in Fig. 1. The resulting expression after collecting terms is:

$$N[\beta + (r_o - r)v - \beta_o] = \Delta N[\beta - rv + R_c v] \quad (5)$$

It is convenient to add and subtract the term $\Delta N r_o v$ from the right side of this equation and to introduce the terminology (Engineering Fundamentals No. 309):

$$u = \beta + (r_o - r)v$$
$$u_o = \beta_o$$

Equation 5 then becomes:

$$N[u - u_o] = \Delta N[u + (R_c - r_o)v] \quad (6)$$

which equation expresses the oil ($\Delta N$) and gas ($R_c$) production in terms of the original oil content ($N$) and the reservoir fluid properties ($\beta$, r, and v).

## References


1. Coleman, Wilde, and Moore; Transactions A.I.M.E. (1930) 86, 174.
2. Katz, D. L.; Transactions A.I.M.E. (1936) 118, 18.
3. Schilthuis, R. J.; Transactions A.I.M.E. (1936) 118, 33.
4. Cook, Alton B.; R.I. 3720, U.S.B.M. Part II, 1943.

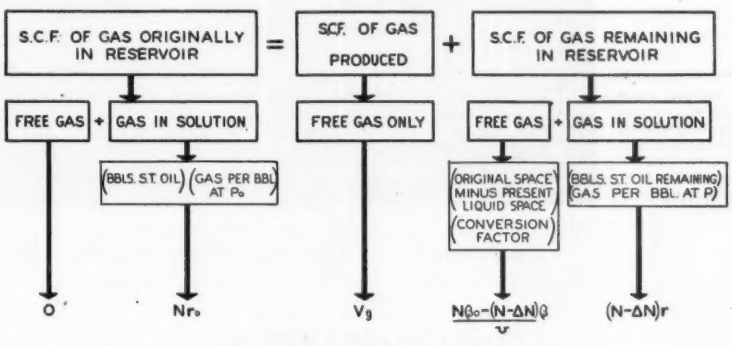
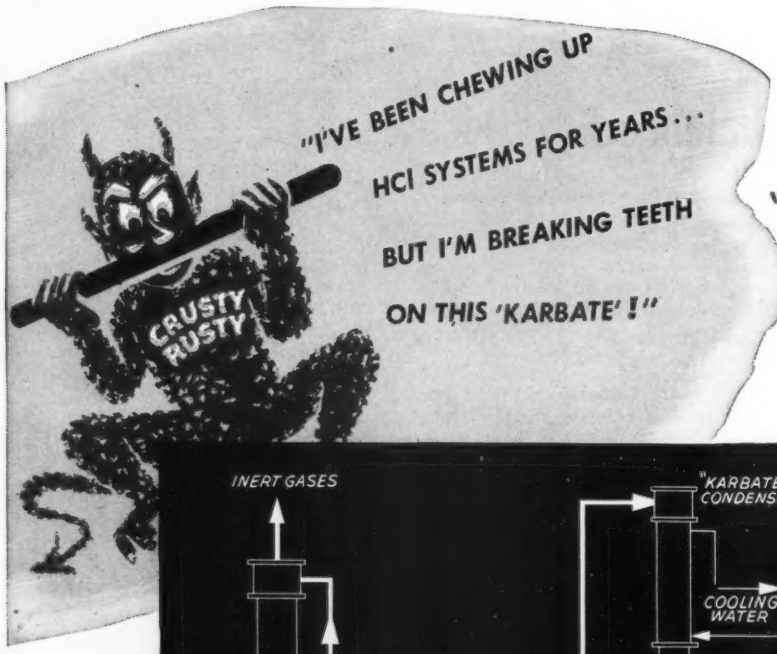



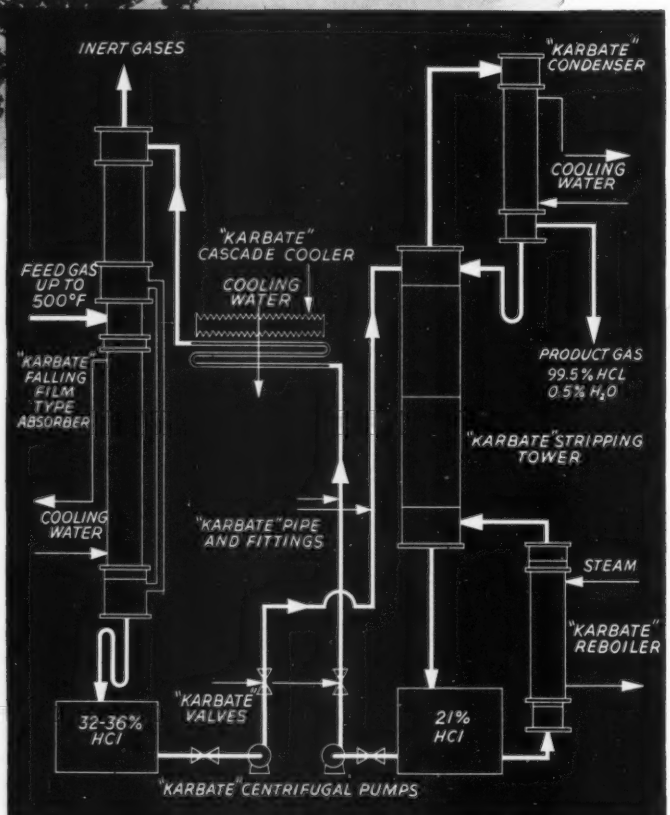

*Fig. 1—Material-balance derivation*

**Series prepared by Dr. John C. Calhoun, Jr., Petroleum Engineering School, University of Oklahoma**

# MAKE ANHYDROUS HCl?




## Whip corrosion with "KARBATE" Impervious Graphite Equipment!




A typical flow sheet of one system for producing anhydrous HCl from feed gases up to 500 deg. F. containing inert gases.

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# The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

## Refinery Piping Colors

Comprehensive refinery piping color scheme employed by Standard Oil Co. (Ind.) in its Whiting fluid catalytic cracking unit.

| Service— | Basic color | Color of bands | Stencil letters |
|---|---|---|---|
| OIL | Black | ..... | .... |
| FUEL OIL | Black | ..... | FO |
| TORCH OIL | Black | Red | .... |
| HYDRAULIC OIL | Black | Blue | .... |
| GLAND OIL | Black | Light Green | .... |
| GLAND-OIL RETURN | Black | Light Green | GOR |
| FLUSHING OIL | Black | White | .... |
| CLEANING OIL | Black | White | CO |
| MED.-PRESSURE FLUSH OIL | Black | Orange | .... |
| WARMING OIL | Black | Orange | WO |
| LOW-PRESSURE FLUSH OIL | Black | Tank Gray | .... |
| WATER DRAWOFF | Black | Dark Green | .... |
| DRAIN (from B-2) | Black | ..... | Drain |
| HOT-PRESSURE DRAIN | Black | ..... | HPD |
| COLD-PRESSURE DRAIN | Black | ..... | CPD |
| WET GAS | Red | ..... | WG |
| LOW-PRESSURE FUEL GAS | Red | | .... |
| HIGH-PRESSURE FUEL GAS | Red | Tank Gray | .... |
| AERATION GAS | Red | Tank Gray | G |
| BLEED GAS | Red | Tank Gray | BG |
| INSTRUMENT AIR | Aluminum | ..... | .... |
| PLANT AIR | Buff | ..... | .... |
| MED.-PRESSURE AIR | Buff | Black | .... |
| BLEED AIR | Buff | Black | BA |
| LOW-PRESSURE AIR | Buff | Light Green | .... |
| VACUUM EXHAUST STEAM | Blue | ..... | VE |
| 10-LB. STEAM | Blue | ..... | E |
| 100-LB. STEAM | Blue | ..... | .... |
| MAKE STEAM | Blue | ..... | MS |
| 400-LB. STEAM | Blue | Red | .... |
| FIRE AND SNUFFING STEAM | Blue | Yellow | .... |
| SUPERHEATED STEAM | Blue | Aluminum | .... |
| COOLING WATER | Dark Green | ..... | .... |
| SERVICE WATER | Dark Green | ..... | SW |
| COOLING-WATER RETURN | Light Green | ..... | .... |
| TREATED WATER | Light Green | ..... | TW |
| HOT WATER | Light Green | ..... | HW |
| BOILER FEED WATER | Light Green | ..... | BF |
| STEAM CONDENSATE | Light Green | ..... | SC |
| BLOWOFF (to B. D. Stack) | Light Green | ..... | BO |
| FIRE WATER | Yellow | ..... | .... |
| CATALYST-AIR | Tank Gray | ..... | .... |
| CATALYST VENT | Tank Gray | ..... | CV |
| PUMPOUT | Brown | ..... | .... |
| SLURRY DRAIN | Brown | Black | .... |
| LIGHT-PRESSURE OIL | Brown | ..... | LPO |
| BLOWDOWN | Dark Gray | ..... | .... |
| RELIEF VENT | Dark Gray | ..... | RV |

No. 199 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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# OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

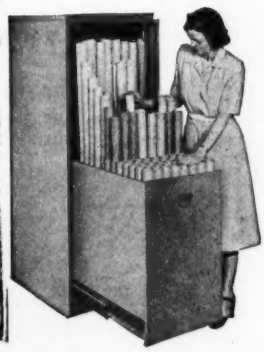
*by John M. Spears*

**(1) TD-24 CRAWLER TRACTOR** has hydraulically controlled steering system, which greatly increases the work capacity of the crawler and gives it new handling ease.

Features include high-speed track and all-weather starting system of 6-cylinder 180-hp. diesel engine. Foot-operated hydraulic clutch, synchromesh transmission, forward-reverse shifting lever and the "Planet Power" final drive are other mechanical advantages of this tractor unit. *International Harvester Co.*

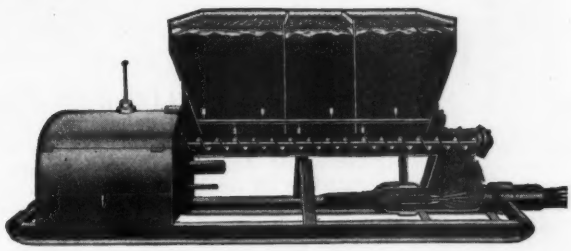
IT'S NEW CHECK IT

**(2) NEW MAP-FILING CABINET** features a large drawer mounted on ball-bearing extensions. Designed for filing large maps, drawings, blueprints, tracings, etc., drawer will accommodate 96 rolled maps which are filed vertically in 2-in.-diameter tubes. Cabinet will accommodate maps or drawings from 30 to 54 in. wide. A heavy disappearing door, equipped with a tamperproof lock, is an important feature which will conserve vital floor space. When opened, door glides back into the side of the cabinet out of the way. Constructed entirely of heavy-gage, electrically welded steel. *Ross-Martin Co.*



IT'S NEW CHECK IT

**(3) NEW MUD-MIXING MACHINE** operates with the mud pump connected to an inlet on its mixing chamber. Unit assures uniform mixture and weight of drilling mud through controlled feed from its hopper to a screw conveyor and the utilization of a high-pressure spray of fluid through a nozzle, injected by the mud pump into its mixing chamber. Conveyor screw is so designed that amounts of material fed from each of its three compartments are equal. Screw shaft as well as a secondary paddle shaft installed above it to prevent materials from clogging the screw are mounted in self-aligning roller bearings. High-pressure spray and the resulting turbulence in the mixing chamber assure positive mixture of fluid and dry materials before flowing into the suction pit. Unit is of all welded construction and the hopper of heavy-gage steel. Spray nozzle in the mixing chamber is hardened to resist cutting and is easily replaceable. Machine may be powered by either an electric motor or steam turbine, to drive a four-speed transmission designed for mixing capacities to meet any condition. *Commercial Mud Mixing Machine Co.*

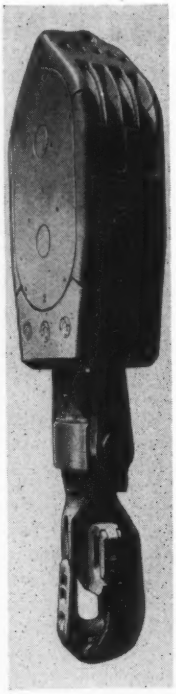


IT'S NEW CHECK IT

**The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.**

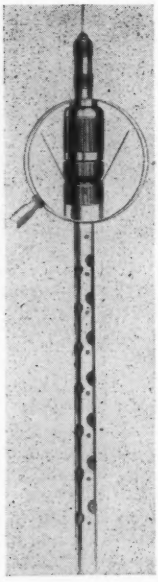
**Keep Informed. Save Time. Tear Out Card. Check It. Mail It.**

## OIL AND GAS EQUIPMENT Digest — IT'S NEW — CHECK IT



**(4) NEW TRAVELING BLOCK** is compact, narrow, and has a capacity of 200 tons. Hook is forged alloy steel with special adapter to traveling block which allows the hook to swing at right angle to traveling block. This eliminates the usual rigidness that is noticeable in some traveling-block and hook combinations. Combination was especially designed for portable drilling units, a saving of 4 ft. in height having been effected. *Regan Forge & Engineering Co.*

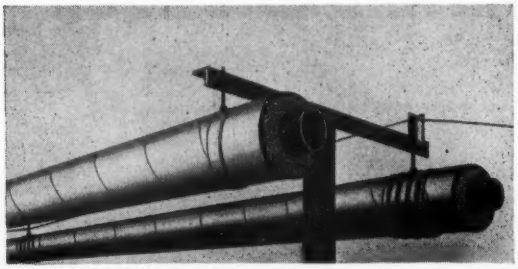
IT'S NEW — CHECK IT



**(5) NEW SONIC INDICATOR** removes guesswork about down-the-hole conditions. New indicator, an electronic device, has been incorporated as an integral part of the manufacturer's electrical-firing gun perforator. It accurately locates collars, liner tops, fluid levels, and well bottoms, and ascertains movement of the gun or speed of its movement by sound. Instrument provides an audible and visible check giving positive information at all times on gun location and movement in relation to line speed. Finder wires protrude from the electrical firing top assembly of gun perforator. As the gun perforator is lowered into the well these finder wires scrape along the inside of the casing. Sound produced is transmitted through radio panel in the electric truck unit where operator listens for identifying sounds. Every down-the-hole condition makes its own distinctive sound, and every change in gun movement signals itself by change of sound. When gun is fired, the detonation can be heard by the operator, eliminating all guesswork. *McCullough Tool Co.*

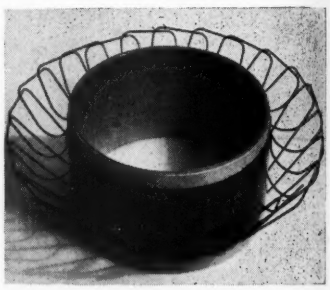
IT'S NEW — CHECK IT

**(6) FOILCLAD PIPE UNITS,** for overhead distribution of oil, viscous fluids, process liquids, and steam are insulated at the factory to meet individual project specifications. Units are shipped in 21-ft. sections, completely prefabricated, and ready for installation with only one handling required at job site. Time and cost of installation are thus minimized. In the prefabrication of these units, asbestos, cork, or other insulation as specified, is machine coated with high-temperature asphalt and tension wrapped with asphalt-saturated asbestos felt. A second coating of asphalt is followed by a tension wrapping of aluminum or copper foil which forms a perfect bond with the asphalt. A variant of the basic type of unit employs a pipe supported within a pipe with insulation around the outer pipe. In this way any desired temperature can be maintained within the pipes. Either pipe can carry the process fluid while the other carries the heating or cooling medium. *Ric-wil Co.*



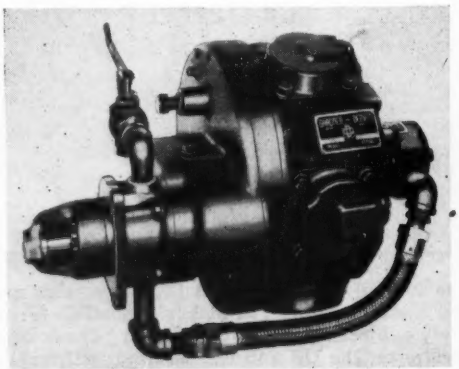
IT'S NEW — CHECK IT

**(7) WALL CLEANER AND CASING CENTRALIZER** is a double-duty tool which does the job of "wall scratchers" and stave-type centralizers. Its full circumferential scraping edge completely removes the objectionable mud sheath by scraping the walls of the hole. Design of spring-wire elements creates the force necessary to hold the casing centrally in the hole when these elements are compressed inside the drilled hole. Minimum resistance to the passage of circulating mud and cement slurry is assured. Available in either solid or split types for all sizes of casing. *Maxwell Bailer Corp.*



IT'S NEW — CHECK IT

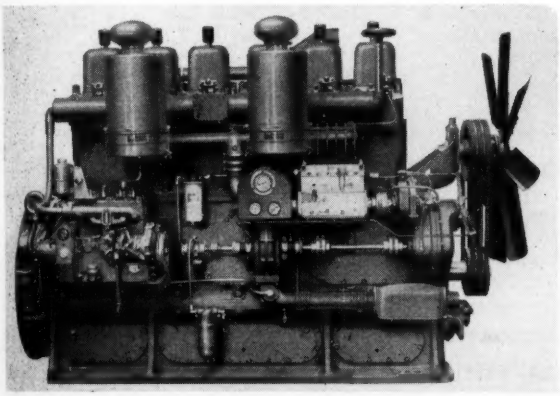
**(8) NEW AIR STARTERS** for gas, gasoline, or diesel engines includes five sizes, developing from 3 to 15 hp. on 100-lb. air pressure. Principal advantages of air starters are their high torque and the elimination of costly battery maintenance and replacements. The high-torque characteristics of the piston-type motor makes it espe-



cially desirable for diesel applications involving high starting loads, while the five-cylinder radial design provides even torque through the operating cycle. An air-actuated starter pinion, when the air valve is open, automatically engages the ring gear a split second before the starter begins to crank the engine, thus assuring positive and safe engagement. *Gardner-Denver Co.*

IT'S NEW CHECK IT

**(9) NEW ENGINE** for oil-well drilling is six-cylinder diesel. The stripped engine is rated at 300 hp. at 900 r.p.m., or as a complete radiator-cooled power unit, at 281 hp. at the same speed. Maximum output of the stripped engine is given as 330 hp. at 1,050 r.p.m. Engine



has 8½ by 8½-in. bore and stroke, six cylinders, with a displacement of 2,894 in. A large seven-bearing 5½-in. graphitic-steel crankshaft is used, which is heat-treated and hardened to give crank pin and main journal hardness of 75-90 scleroscope index. Cylinder block is one-piece casting into which are inserted the six hardened wet-cylinder sleeves held in place by individual cylinder heads and head gaskets at the top and the usual synthetic rings at the base. Cylinders are of a special hardened alloy which test 400 Brinell. *Waukesha Motor Co.*

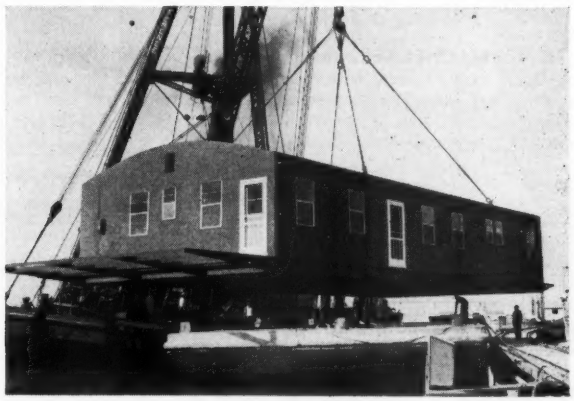
IT'S NEW CHECK IT

**(10) REPLACEABLE BLADE BIT** decreases cost per foot of hole in shot hole and core drilling. Worn blades can be replaced right on the drill, thus reducing bit changing time. Blades may be replaced on the bit in a matter

of minutes and no special tools are required. Bit cannot be assembled incorrectly, and there is no movement of blades or any other part of the bit during drilling. Blades are shaped and ground so that each edge removes only a small portion of the total hole being cut. Formation is removed in small chips and pieces which are easily circulated to the surface. Full-gage hole is assured since forged blades are uniform and wear evenly at all points. Different sizes of blades are interchangeable on the bit head assembly. *Herb J. Hawthorne, Inc.*

IT'S NEW CHECK IT

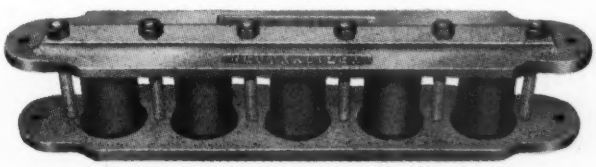
**(11) FABRICATED STEEL HOUSES,** for use by oil companies in the Gulf of Mexico, are prefabricated and transported to the gulf on barges. They are then mounted on piling which has previously been placed on location. Houses will provide complete living accommodations for approximately 30 persons. This includes sleeping quarters, toilet and wash-room facilities, recreation room, office, galley, and an independent mess



room. Houses are completely air conditioned and offer the utmost in comfortable living quarters. *Avondale Marine Ways, Inc.*

IT'S NEW CHECK IT

**(12) ELECTRO-NEUTRALIZER** eliminates boiler scale and prevents pitting and corrosion of boiler and boiler tubes. Removes existing scale in boiler and entire steam system. New device easily installed in boiler operates on the electrolysis principle that two dissimilar metals



when joined together will generate electrical currents by galvanic action. Dangerous scale-forming minerals, metals, and free gases are precipitated out of solution and disposed of harmlessly. Unit is self-contained and economical. No electric connections are needed. Eliminates use of chemicals. *Oklahoma Neutralizer Co.*

IT'S NEW CHECK IT

## TRADE LITERATURE

**(13) SCIENTIFIC INSTRUMENTS.** New 274-page catalog describes numerous scientific instruments for use in chemical, physical, metallurgical, engineering, and materials-testing laboratories. Generously illustrated and includes comprehensive data on general laboratory equipment. *American Instrument Co., Inc.*

IT'S NEW ✓ CHECK IT

**(14) AIR FILTERS.** A two-color eight-page bulletin describes complete line of Staynew dry-type intake air filters for all types of air compressors, diesel and gas engines, blowers, motors, and generators. Various filters described in this bulletin include silencer models, regular dry-type and breather filters. They range in size from 6 to 8,000 cu. ft. per minute in single units. *Dollinger Corp.*

IT'S NEW ✓ CHECK IT

**(15) WELLCHECKER.** New 10-page 3-color bulletin describes wellchecker which is an oil and gas separator, completely piped with oil meter, automatic b.s. and w. sampler, gas run, orifice meter, fittings, and all controls. Illustrated. *Rolo Manufacturing Co.*

IT'S NEW ✓ CHECK IT

**(16) QUONSET BUILDINGS** for the petroleum industry are described and illustrated in pocket-size 16-page handbook. Material emphasizes all-purpose buildings at low cost, immediate delivery, and quick erection. *Stran-Steel Division, Great Lakes Steel Corp.*

IT'S NEW ✓ CHECK IT

**(17) TWO-WAY MOBILE RADIOPHONE.** A four-page pamphlet covers two-way mobile radiophone for use in exploration, drilling, and pipe-line operations. Simplified installation, low cost, and trouble-free operation are features brought out in pamphlet. *Belmont Radio Corp.*

IT'S NEW ✓ CHECK IT

**(18) DIAMOND-DRILL BITS.** New catalog presents diamond-drill-bit products and services for oil-field drilling. Illustrated. *Wheel Trueing Tool Co.*

IT'S NEW ✓ CHECK IT

**(19) FUEL INJECTION PUMP.** New five-page bulletin describes how the fuel injection pump operates. Mounting, driving, and application data included. *American Bosch Corp.*

**(20) OIL RECLAIMERS, PURIFIERS, AND FILTERS.** New four-color brochure illustrates various applications of oil reclaimers, airline oil purifiers, and Hyflow oil filters. *Hilliard Corp.*

IT'S NEW ✓ CHECK IT

**(21) MIDGET PUMPS.** A 16-page, 2-color bulletin features midget pumps and laboratory stirrers for all laboratory and pilot-plant applications. Performance curves included. *Eastern Industries, Inc.*

IT'S NEW ✓ CHECK IT

**(22) UNIONS AND VALVES.** Fittings, unions, and valves are described and illustrated in 16-page catalog. Dimensions tables and list prices are given for each item. Sectional views show interior. *Catawissa Valve & Fittings Co.*

IT'S NEW ✓ CHECK IT

**(23) FRICTION MATERIALS.** Two bulletins describe and illustrate Key-Lok draw-works brake-band lining and seven other types of brake and clutch linings for drilling rigs and oil-field equipment. *National Supply Export Corp.*

IT'S NEW ✓ CHECK IT

**(24) STEEL SHIPPING CONTAINERS.** New plastic-bound cellophane-covered catalog reveals variety of products shipped in drums, barrels, and kegs. First half of book shows every type of single trip, returnable, light-weight, agitator, decorated and stainless-steel container made by company. Many pictures are in full color. *Steel Shipping Container Division, Rheem Manufacturing Co.*

IT'S NEW ✓ CHECK IT

**(25) VERTICAL AIR DISCHARGE COOLING UNITS.** Special catalog on "VAD" units should prove particularly informative to those whose cooling and condensing requirements are abnormally large. Catalog contains eight pages of illustrations, diagrams, dimensions, and full descriptions of these large units which are available in sizes capable of dissipating from 3,000,000 to 15,000,000 B.t.u. per hour under standard conditions. *Young Radiator Co.*

IT'S NEW ✓ CHECK IT

**(26) SLUSH PUMP LINERS.** New six-page foldout describes liners manufactured under special hardening process which assures a file-hard wearing surface. Case histories of successful operators are presented. *Tool Steel Gear & Pinion Co.*

**The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.**

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# REFINING

## Socony's Casper Plant Expansion Well Along

NEW YORK. — Completion of its general refinery expansion program at its Casper, Wyo., refinery by December 1948 is forecast by Socony-Vacuum Oil Co., Inc. All phases of this program are now under way and are being pushed to completion as fast as conditions permit, the announcement states.

The refinery's crude capacity, now rated at 3,000 bbl. per day, will be doubled by this expansion. The plant manufactures gasoline, kerosine, distillate heating fuels, tractor and diesel fuels, and asphalt, all of which are marketed in Wyoming, Nebraska, Colorado, and other neighboring states through the company's White Eagle Division. Two Wyoming crudes are charged to the stills.

Catalytic Construction Co. of Philadelphia is general contractor for this work, in charge of mechanical design and field construction under the guidance of Emory M. Skinner, chief refinery engineer for White Eagle Division. Included in the expansion is a thermofor catalytic cracking unit; a new light-oil pump-house to handle the increased production of refined materials, and a hydrogen sulfide removal unit, of 4,000,000 cu. ft. per day gas capacity.

A new catalytic polymerization unit will be installed also, along with a steam plant to produce 30,000 lb. of steam per hour. Other items include additional heavy oil and asphalt pump capacities, truck-loading facilities, a new office building, medical facilities, change and locker house, and machine shop expansion. A new river-water treating unit with a new cooling tower is being built in two sections, supplying 4,500 gal. per minute at 75° F. and 2,500 gal. per minute at 80° F. Two independent two-stage, atmospheric - vacuum crude stills are employed, each processing a different crude.

## British Chemical Plant Will Be Enlarged

Expansion plans for the chemical plant of Petrochemicals, Ltd., now being built near Manchester, England, are under way with negotiations nearing completion to provide new funds amounting to about $10,800,000.

The company operates the "Catarole" process, and its plant is said to be the first in the world to produce a full range of aromatic hydrocarbons from petroleum. The output of the new plant which was originally designed for 50,000 tons of various products annually has been increased to 70,000 tons. The products will replace at low cost material formerly imported from Germany at high prices.

Some units of the new plant are expected to be in operation by the end of this year, while full-scale operation is expected some time in the latter part of next year.

Expansion plans also include the construction of a new plant to make styrene for plastics and synthetic rubber.

## North Dakota Revises Gasoline Test Standards

Effective June 1 and for the following 3 months gasoline sold in North Dakota must not show over 9 lb. vapor pressure on samples taken from tank cars or storage, the state laboratories department of North Dakota announced recently.

## Crown Will Buy Crude From Republic Natural

HOUSTON.—Crown Central Petroleum Co., which operates a 26,000-bbl. daily refinery in Houston, has arranged for purchase of about 80,000 bbl. of crude oil monthly from Republic Natural Gas Co. in the Corpus Christi area.

The deal is effective June 1 with the crude coming from Republic's production in East White Point field, San Patricio County. Reports here were that a 35-cent premium was involved. This is the highest yet reported in the Gulf Coast area.

## British Report Available On German Oil Activity

A critical evaluation of the German petroleum and synthetic oil industry is the first in a new series of British Intelligence Objectives subcommittee reports on German technology, which are being made available to American businessmen of Great Britain, according to John C. Green, director of the Office of Technical Services, U. S. Department of Commerce.

An appendix contains a bibliogra-


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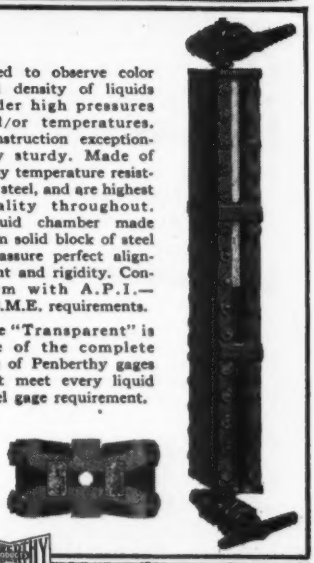

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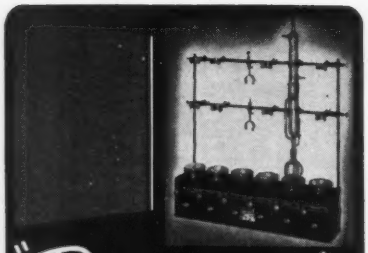

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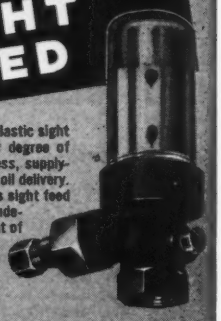

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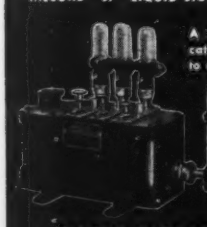

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phy of over 150 petroleum and synthetic oil reports, which were prepared by American and British investigators. All of the reports listed in the bibliography are available from the Office of Technical Services.

Printed copies of B.I.O.S. Overall Report No. 1, Report on the Petroleum and Synthetic Oil Industry of Germany, are available from the British Information Services, 30 Rockefeller Plaza, New York, at $3.

## Allied Oil Opens Marine Terminal at Kobuta, Pa.

A new 3,000,000-gal. storage capacity residual fuel oil marine terminal at Kobuta, Pa., has been opened by Allied Oil Co., Inc. The terminal, which is across the Ohio River west of Rochester, Pa., is the sixth largest storage facility operated by Allied.

The terminal is served by a floating dock equipped with steam and electric pumps to handle heavy Bunker "C" fuel received from lower Mississippi and Gulf Coast ports by barge. Delivery from Kobuta will be made by tank car and truck to industrial plants in western Pennsylvania.

Allied Oil and its subsidiaries also operate a 10,000-bbl. refinery at Canton, Ohio, a fleet of oil tankers on the Great Lakes, and three marine terminals at Lake Erie ports.

## Technical-Industrial Meet Of W. P. R. A. Planned

A joint meeting of technical-industrial relations, each phase to be followed by discussion from the floor, will be conducted by the Western Petroleum Refiners Association at the Broadview Hotel, Wichita, Kans., June 11.

At the industrial phase of the meeting Willard Bassmann, supervisor of training for Interstate Oil Pipe Line Co., will address the group on "Training Foremen to Handle Men." The afternoon technical session will hear: "Fundamental Principles of Design of Suspended Arches and Sectionally Supported Walls," George Ellerton, Jr., American Arch Co., New York; and "Combustion and Efficiency," Hugh Wiant, Combustion Research & Development Co., Inc., Jersey City, N. J.

## Socony-Vacuum Announces New Insecticide

Development of a new petroleum product, "S/V Sovacide F," which when coupled with DDT or other chemicals becomes an extremely potent weapon against undesirable insects in forests and nonagricultural area, has been announced by Socony-Vacuum Oil Co., Inc. The product's use on farm crops is still experimental.


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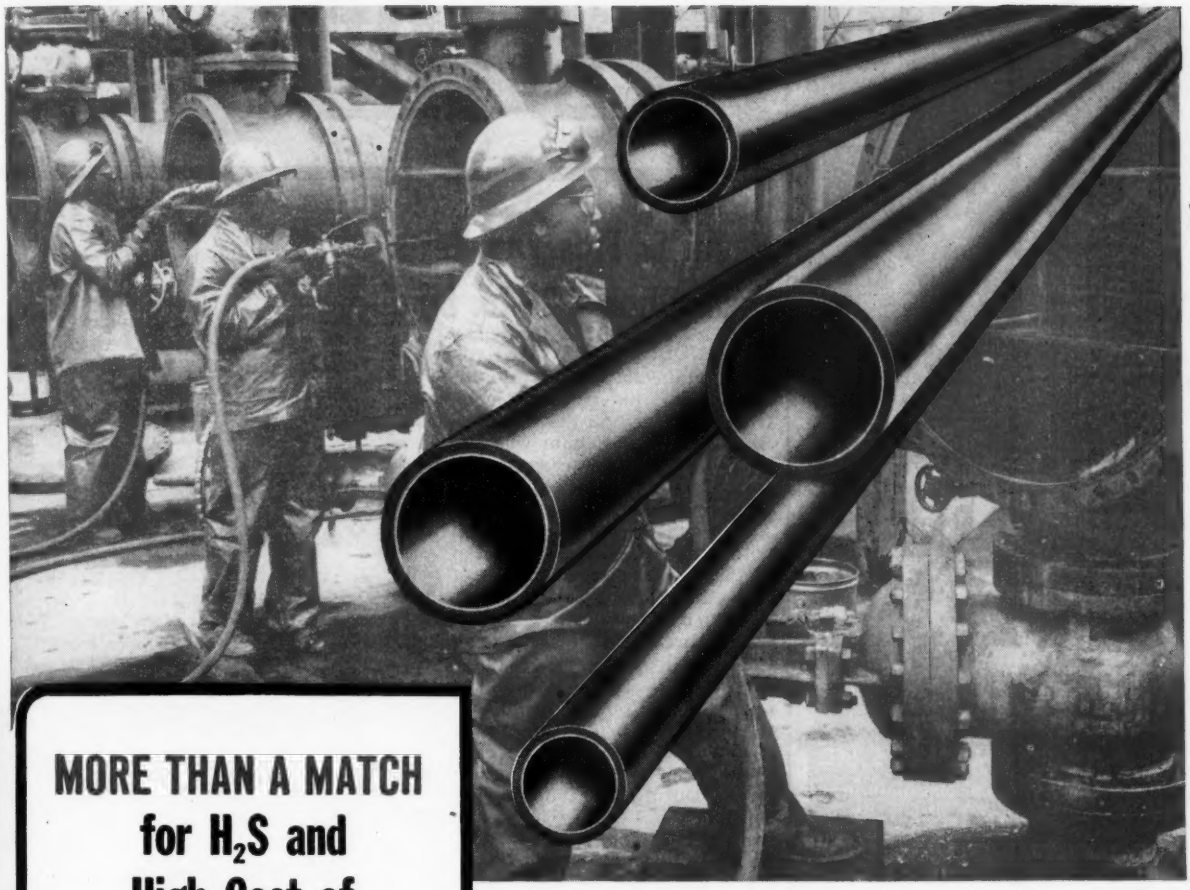

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# PIPE LINES

## Magnolia Fills and Tests Texas-Illinois 20-In. Line

MAGNOLIA PIPE LINE CO. is pumping crude oil into the 648-mile, 20-in. line recently completed from Corsicana to the Patoka-Salem, Ill., area. The last joint was laid May 20. Early this week, crude oil pumped from Corsicana had advanced considerably beyond the midway point. Ahead of the oil the line is filled with water for the application of tests at 700 psi. It is expected that oil will reach the Patoka-Salem area in the latter part of June.

The three pumping stations along the line, located at Foreman, Ark., Conway, Ark., and Doniphan, Mo., have all equipment installed ready for operation. A high line under construction to serve the Conway station is expected to be completed this week. During the later months of construction, crude oil shipments from the line were forwarded from Conway by tank cars. These shipments have stopped and the loading rack has been dismantled.

Magnolia's schedule calls for shipping at the rate of 100,000 bbl. daily. Of this amount, 45,000 bbl. will be pumped eastward through the Magnolia 10-in. line from Patoka to Lima, Ohio; 30,000 bbl. will go through the Texas-Empire Pipe Line Co. system via Salem to Chicago; 25,000 bbl. will move westward through the Magnolia 10-in. line via Patoka to the Socony-Vacuum Oil Co., Inc., Lubrite division, refinery at East St. Louis, Ill. Magnolia's East St. Louis-Patoka-Lima 10-in. line was built in 1939.

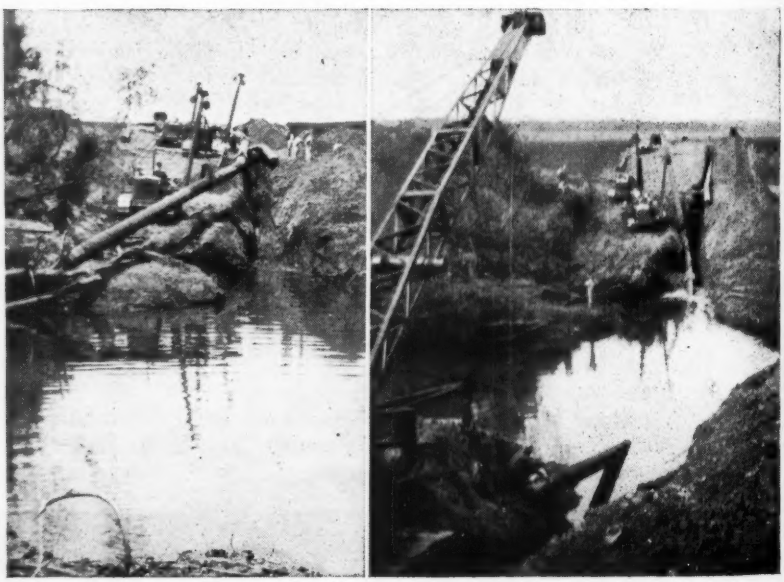
## Socony-Vacuum to Start Maine Line Near Bangor

Operations for the construction of the Socony-Vacuum Oil Co., Inc., 127-mile, 4-6-in. Portland - Bangor, Me., products line, are planned to start at Bangor. Pipe laying is scheduled to begin about June 15.

L. D. Gray, superintendent, Associated Contractors & Engineers, will be in charge of the contractor's operations. The project is scheduled for completion before November 1.

## T.G.T. Prepares for Ky.-W. Va. Loop

Tennessee Gas Transmission Co. is preparing to start construction of a 90-mile, 24-in. loop to extend between



*Pictured here are two stages in the operation of pulling a section of 20-in. pipe across a creek in Osage County, Oklahoma, in connection with the construction of loops for a program being completed in 1948 by Stanolind Pipe Line Co. to increase capacity of the trunk line between Drumright, Okla., and Whiting, Ind. (Photo by courtesy of J. J. Jackson)*

# PIPELINES

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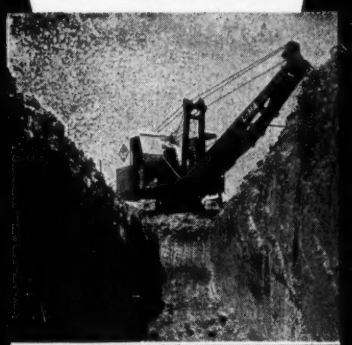

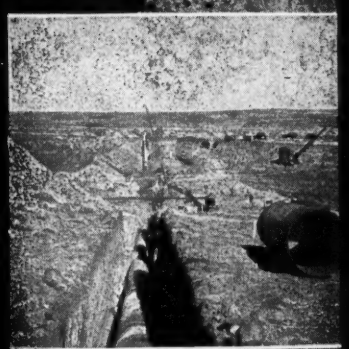

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the Catlettsburg, Ky., and Clendenin, W. Va., areas. Pipe laying will start about June 15.

Oklahoma Contracting Co. is moving two spreads from the completed Magnolia Corsicana - Patoka 20 - in. project. The contractor's operations will be directed by Paul Halbert; the two spreads will be supervised by C. R. Ice and W. A. Wiley. Field offices will be established at Huntington and Charleston, W. Va.

## Route for Tierra del Fuego Line Is Studied

David R. Williams, vice president, Williams Brothers Co., and W. G. Heltzel, consulting engineer, are flying to Santiago, Chile, at the end of this week en route to Punta Arenas in Tierra del Fuego. From there they will go to Spring Hill field to investigate terrain on the route of a proposed crude-oil pipe line to be built for the government of Chile. The line, 50 miles in length, will connect the field with a marine terminal.

The terrain is reported to be sand, clay and gravel. Highest elevation of the proposed line is approximately 220 ft. No oil has been transported yet from Spring Hill field which is now estimated to have potential production of 4,000-5,000 bbl.

## Sunray Duncan-Allen Line Begins Operations

Sunray Oil Corp. is now handling shipments through the 96-mile, 6-in. products line between Duncan and Allen, Okla. The first shipment was 100,000 bbl. of gas-oil for charging stock for the company's refinery at Duncan. Finished products are to be pumped from Duncan to the company's Allen refinery by reversing the flow of the line. Shipments will be moved at the rate of 10,000 to 15,000 bbl. daily.

All stream crossings were overhead with pipe suspended by cables, the longest of which was 272 ft. across the Washita River near Wynnewood.

Sunray has built three pump stations each with an 80,000-bbl. tank, and six 80,000-bbl. storage tanks for pipe-line storage at Duncan. The pump stations, located at Duncan, Allen, and Wynnewood, are of red brick, housing the pumps and engines and providing an office at each point. The eight-stage centrifugal pumps are driven by six-cylinder dual-fuel diesel engines that develop 540 hp. at 600 r.p.m. The pumps have a discharge pressure of 1,100 psi. capable of handling from 10,000-15,000 bbl. daily.

With the pump station and storage facilities at Wynnewood, Sunray is also able to purchase charging stock from other refiners in the area, and hold the material at any of three


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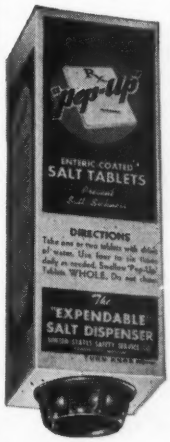


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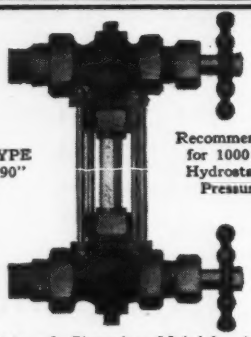

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PIPE LINE SURVEYS

storage areas until needed at the Duncan refinery.

A complete telephone communication system has been installed along the line connecting all operating points from Drumright to Duncan. Houses for key personnel operating this system have been built.

On April 26, 1947, Sunray in collaboration with Wilcox Oil Co. completed an 83-mile, 8-in. products pipe line from Allen to Drumright, this line has a daily capacity of 30,000 bbl. At Drumright Sunray products are delivered to the Great Lakes pipe-line system, and by this method have an outlet to the growing markets of the North and Middle West.

Completion of the new pipe line brings Sunray's total Oklahoma pipeline system to more than 325 miles, and additional lines are being planned for transportation of crude oil to supply the company's refineries.

## Lone Star Gas Plans Opelika-Dallas Line

Lone Star Gas Co. has announced plans for construction of a 100-mile, 20-in. carrier gas pipe line from Opelika field of Henderson County, East Texas, to Dallas. Lester Potter, Lone Star spokesman, said the line would be constructed as soon as pipe is available. The additional capacity is to augment Dallas' industrial supply.

Potter said that Dallas facilities would be augmented by the firm's compressor expansion program, involving some $1,590,500 worth of construction in Texas and Oklahoma. Application for permission to begin work on the line has been placed before the Federal Power Commission.

## Shell-Texas Loading Racks Being Constructed

Work is under way on the construction of two tank-car loading racks immediately adjacent to the Missouri-Kansas-Texas Railroad lines at Wichita Falls, Tex.; one will be owned by The Texas Pipe Line Co. and the other by Shell Oil Co., Inc.

Expected to be completed by July 15, the racks, which will consist of two loading units, each serviced by two sets of tracks, will handle 138 tank cars, loading 70,000 bbl. of West Texas crude daily from the Jal-Wichita Falls section of the Jal-Cushing pipe-line project.

The new racks are intended as a temporary measure to assist in relieving the critical transportation shortage pending completion about May 1, 1949, of the Jal-Cushing pipeline system and the Cushing-St. Louis-Patoka, Ill., pipe-line system.

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***Headquarters for Dependable Pipe Protection***

Strategically located in the heart of the South Texas fields, the Corpus Christi plant of Pipe Line Service Corporation is devoted exclusively to the application of pipe protection. Located on a 6-acre site, this modern plant has complete facilities for cleaning, priming, coating and wrapping, as well as for reconditioning used pipe.

The Corpus Christi plant is just one of six plants conveniently located to serve pipe users on gathering, transmission and distribution lines.

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PIPE LINE SERVICE CORPORATION

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# NATURAL GAS

## Large Gas Lines Swamp Mills, Steel Man Says

THE tremendous increase in consumer demand for natural gas and the striking trend toward transmission lines of very large diameter has made it impossible for the steel industry to keep pace with the orders for line pipe and gas companies are turning to storage facilities as a means of meeting peak and emergency demands, it was declared by G. Lawton Johnson, assistant general manager of sales of National Tube Co., in addressing a recent meeting of the technical section of the Pacific Coast Gas Association.

Actual demand for industrial, commercial, and residential users is expected to reach the staggering total of 4,742,515 million cubic feet of gas by 1952, or almost twice what it is today, he predicted. He said this is due not only to additional customers, but also to the increase in the average consumption of each user, declaring that in 1946 the consumption was 69,300 cu. ft. per customer and in 1952 it is expected to be 99,750 cu. ft. per customer per year.

While the increase in gas reserves and in drilling gas wells probably will keep pace with the increased consumer demands, line pipe will not be available in sufficient quantity for some time, Johnson said, continuing:

"One of the most important new factors in regard to pipe lines is their increased size. This reflects directly on the availability and finishing capacity of the steel industry. The average tonnage per mile of pipe line in 1946 was 171½ tons as compared with an average of 86 tons in 1938.

"In the years 1937 to 1941, 49 per cent of the gas pipe lines were 12 in. and under, 19 per cent were in the 14-in. to 18-in. group, and 30 per cent in the 20-in. to 26-in. group. In 1946 the ratio had changed to 17 per cent 12-in., 26 per cent in the middle group, and the large diameters had increased from a mere 30 per cent to 56 per cent. The projected future figures, based on this trend and on present planned construction indicate that the first group has dropped to 3 per cent, the middle group will be only 5 per cent, and the large outside diameter group, 20 to 30 in. in size, has increased to 92½ per cent.

"Based on tonnage the picture is even more serious. During the 1937-1941 period the 12-in. and below group represented 29 per cent of the tonnage, the 14 to 18-in. group 20 per cent, and the 20-in. 50 per cent. Construction during 1946 changed this ratio to 8 per cent below 12-in., 20 per cent in the middle group, and 73 per cent in the 20 to 30-in. range. Again looking at this projected and planned construction for the 1947-1951 period, sizes below 12 in. are only 1 per cent of the tonnage, the 14 to 18-in. group is 3 per cent, and 96 per cent of the total tonnage will be in the large diameter sizes, from 20 to 30 in.

## Gas-Well Tests Ordered For Panhandle Field

AUSTIN.—Tests of approximately 1,200 gas wells in Panhandle field have been ordered by the Texas Railroad Commission commencing June 1.

The testing program will be the first of its kind carried out since 1939 and will employ a method under which all gas used will be delivered into pipe lines. This will save some 8,500,000,000 cu. ft. over previous testing methods.

Owing to shortage of personnel, during the war the commission allowed the data required to be calculated from well-head pressure readings. The coming tests are expected to take about 6 weeks and will be under commission engineers headed by Sol Smith, senior engineer, Austin, and J. G. McClintock, deputy supervisor, Pampa.

## Security Board Launches Study of Gas for Defense

WASHINGTON.—The National Security Resources Board has initiated an investigation of the natural and manufactured gas industries with a view to determining their potentialities in the event of an emergency.

Plans for the investigation were made last week at a meeting of NSRB officials and 42 representatives of the gas industries.

The study, to be under the direction of Edward Falck, chief consultant on power and utilities, will include a survey of the supply and estimated demand for natural and manufactured gas service during the period 1948-52; a report on present planned construction by the industry and on specific production or construction bottlenecks; an economic study of gas in relation to coal and fuel oil, from the standpoint of conservation of fuels most vitally needed for defense; and a technological study of developments affecting the gas industry.

## Superior Offers Sale of Its Natural Gas Reserves

The natural gas reserves of Superior Oil Co. estimated in excess of 2,000,000,000,000 cu. ft., are being offered for sale, according to Howard B. Keck, vice president. For the most part these reserves have been closed to production since 1944 and underlay fields in Coastal Louisiana and Texas.

Negotiations are being handled by S. F. Magor, general manager of manufacturing and sales for Superior, and Alec M. Crowell, gas engineer of Shreveport.

The dry-gas residue at 10 cents per 1,000 cu. ft. is valued at $20,000,000, and the liquefiable hydrocarbons in the reserves at $30,000,000.

# Natural Gasoline

## Maysville Propane Plant Will Have High Recovery

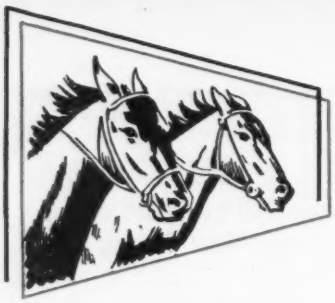
Design of the fractionating section in the gas processing project being constructed in the Maysville, Oklahoma, field calls for 90 per cent recovery on propane. Owned jointly by Warren Petroleum Co., Cities Service Oil Co., Carter Oil Co., and Sinclair Prairie Oil Co., the project is scheduled for final completion in early 1949.

Input capacity of the two remote absorption sections of the project is reported at 105,000,000 cu. ft. per day. These units, one located in the Southwest Antioch field and the other in the Lindsey field, operate in absorption service only. Residue gas from these two sections of the operation is boosted to 2,250 psi. for reinjection. Rich oil from these operations is pressured to the fractionating plant.

No steam is employed for processing at the stripping end of the operation. Rich oil delivered from the remote absorbers is heated in direct fired equipment. Product and intermediate cooling is accomplished with air. The final cooling operation is made with induced-draft equipment.

Water for engine cooling and for other purposes is obtained from wells located 19 miles south of Maysville. Of exceptionally good quality, the water requires no treating. Capacity of the water system is rated well over actual plant requirements.

Design and construction of the project is being handled by Dresser Engineering Co., Tulsa. One stage of the project is scheduled for completion in July.



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## Among the

# Drilling Contractors

### Deep Test for Kentucky

**L. G. Watkins,** Fairfield, Ill., is starting on a 7,500-ft. test to the Knox dolomite for Pure Oil Co., Ashland Oil & Refining Co.,. and I. B. Browning in Webster County, Kentucky. This deep well is the 1 M. L. Walker, NE 22-N-24, 1¼ miles southeast of Sebree.

### Three Wildcat Contracts Awarded in Florida

Three contracts have been awarded in recent weeks for wildcat wells in Florida. Two of the tests are to be drilled in Collier County which contains the state's only oil field—Sunniland.

Humble Oil & Refining Co. is the operator for the two Collier County wells. Dorris Ballew Drilling Co., Fort Worth, has received contract for Humble 13 Gulf Coast Realty Co., C NE SW 21-47s-28e, 10 miles west of Bunker Hills. Loffland Brothers, Tulsa, will drill Humble B-1 Lee Cypress Co., C SE SE 13-48s-29e, 3 miles north and 3 miles west of Sunniland.

In Holmes County, R. T. Adams Drilling Co. has been awarded contract for S. P. Borden 1 Moore, C SW NW 15-5n-18w, about 14 miles northeast of Defuniak Springs.

### New Mud Courses Started in California

LOS ANGELES.—Two new drilling-mud-control classes, sponsored by the American Association of Oilwell Drilling Contractors, have been commenced in the San Joaquin Valley, according to an announcement by W. F. Jones, secretary of the California chapter.

One group is under way at Bakersfield Evening High School and the second class at that location was started on May 24. These classes are being given 5 nights per week for 2 weeks each.

A class at Taft Evening High School is also in progress, being given 2 nights a week for 8 weeks.

The sixth class at John Dewey School at Long Beach also was started on May 24. To date a total of 135 students have graduated from the Long Beach school and a total of 383 applications for mud-control instruction have been filed with the office of the California chapter of A.A.O.D.C. Of these, 163 are employed by drilling contractors while 220 work for other companies.

Due to the great demand for the

*Ten days after the close of the 1948 International Petroleum Exposition at Tulsa some of the extremely heavy machinery was still being dismantled—but on the other hand much of the drilling equipment that was exhibited this time was highly mobile and could be moved out in a hurry. Indicative of the trend evidenced at the oil show toward quick erection and dismantling was this 136-ft. Lee C. Moore drilling mast. Portable "masts" to some people may still leave a meaning of lightweight structures, but the "big masts" are designed and constructed to do the job of any conventional drilling derrick. The Moore mast shown can rack 15,000 ft. of 4½-in. drill pipe and has a gross capacity of 830,000 lb.*


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For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

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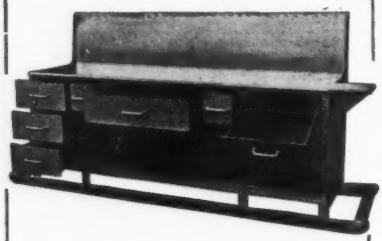

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instruction, it is anticipated that schools will be inaugurated at Coalinga and Ventura as soon as arrangements can be completed. The classes cover eight basic subjects of mud control. These are: standard mud tests, use of chemicals in drilling muds, control of viscosity, control of weight, control of pH, water-loss control, starch muds, and oil-base muds.

## Two Contracts for Penrod

Penrod Drilling Co., Shreveport, has received two recent wildcat contracts for East Texas wells. First is Hunt Oil Co. 1 Hamilton, F. R. Kendall Survey A-460, 3 miles west of Corsicana, which is a scheduled 7,000-ft. test. Second Penrod contract is William Herbert Hunt 1 Leopard, John Hallam Survey A-35, 7 miles east of Henderson. Contract is for a 7,500-ft. test.

## 13,319 Ft. of Open Hole

A record is claimed for Rocky Mountain Drilling Co. with the completion of the Standard Oil Co. of California 1-1 Houghton Community, deep Santa Fe Springs test. On this unsuccessful wildcat, Rocky Mountain carried 13,319 ft. of open hole, believed to be the most open hole of any well on record.

**Maiken Drilling Co.** has contract for Skelly Oil Co. 1 U. D. Sawyer, southwest outpost to Mid-Continent Petroleum Corp.'s recent discovery in Lea County, New Mexico. Derrick is going up and water wells are being drilled for Skelly's well which is in NE 33-9s-36e. Mid-Continent's discovery was a rank wildcat and attracted much attention throughout the industry. It was completed through ¾-in. choke for 4,000 bbl. daily.

**Decem Drilling Co.,** Oklahoma City, is drilling a deep wildcat for Phillips Petroleum Co. et al in Canadian County, Oklahoma. Test is 1 Piedmont, C NW SE 2-13n-6w, west of the town of Piedmont.

**Glasscock Drilling Co.** has applied for permit to drill 1 Roy Burroughs, wildcat in C NW NE SW 35-17n-7e, 4½ miles south and 2 miles east of Rayville townsite, Richland Parish, North Louisiana.

**Miller & York,** Bakersfield, has contract for Pacific Oil & Gas Development Corp. 71-22 Cantleberry, in Jasmine area, Kern County, California. Same contractor will also make hole on a test in Mount Poso field for Dumm Brothers.

**Santa Fe Drilling Co.,** Santa Fe Springs, will drill three wells in Bardsdale field of California for Union Oil Co.

Tiger Tooth TONG DIES

Web Wilson "TIGER TOOTH" Tong Dies have a pyramidal, pointed tooth pattern that assures a positive, "biting" grip on the hardest tool-joints under the strongest pulls. Especially recommended for flame-hardened and hard metal surfaced tool joints or wear subs. The sloping sides and heavy base of the pyramidal shaped teeth gives extra strength and backing to each tooth. Tiger Tooth Tong Dies will not easily break down even in severe service. They are of the "full-length" design that completely fills die slot in the tong and are reversible to provide extra service life. . . "TIGER TOOTH" Tong Dies will fit all tongs used in the oil fields today—for dependable, economical service, specify WEB WILSON "TIGER TOOTH" TONG DIES.

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# Exploration and Drilling

## New Viola Pool for Barber County, Kansas

THE rating of Lion Oil Co. 1 DeGeer on official potential test as a maximum well (3,000 bbl. potential rating) by Kansas, stirs up more interest and again raises questions about how big the oil potentialities of Barber and adjacent counties really are. The Lion well is in NW NE SW 2-33s-15w, and the pool opened has been named DeGeer.

The potential rating was made on basis of the bottom-hole-bomb method used in official tests. Prior to this the well had flowed 35 bbl. in 1 hour through a 17/64-in. choke and 29 bbl. per hour through an 11/64-in. choke for 3 hours, gravity 41°. A 5-in. production string was set at 5,343 ft. in the Arbuckle, and plugged back to 5,225 ft., before perforating. Production is coming from the Viola lime through perforations in the casing, 23 shots at 5,176-78 ft. In the course of the potential test, bottom-hole pressure was registered at 1,925 psi., tubing pressure at 410 psi., and casing pressure 250 psi.

Total depth originally drilled was 5,434 ft., or 53 ft. below the top of the Arbuckle. With elevation of 1,946 ft., the following datum tops were reported: Lansing —2,294 ft., Mississippian —2,910 ft., Viola —3,200 ft. (some reports place it at —3,220 ft.), Simpson shale —3,321 ft., Simpson sand —3,325 ft., Arbuckle —3,435 ft.

To those geologists who have ideas about this area based on the interval from the top of the Viola to the top of the Simpson sand, it will be important to check whether the datum on the Viola is —3,200 or —3,220 ft. If the shallower figure is correct, the Viola-Simpson sand interval is 125 ft.; if the other figure is right, the interval is only 105 ft. This interval in Skelly Oil Co. 1 Boggs "C," SW NE NE 17-33s-12w was 112 ft.; in Continental Oil Co. et al 1 Smith, NW NW NW 21-33s-12w it was 111 ft.; but in Sinclair Prairie Oil Co. 3 Oldfather, NW SW SE 7-31s-14w, it was 127 ft.

The nearest Viola production is in Deerhead field, about 1½ miles north of the new discovery. Deerhead produces 400-500 bbl. daily of 24°-gravity oil from about 15 wells. The DeGeer discovery is also about 15 miles west and a little north of Boggs pool. which is producing around 1,000 bbl. daily of 26°-gravity oil from Simpson sand.

For those who study production trends, either completely dissociated from geology, or first independently of geology and then trying to fit in geology with ideas gained from pure trends of production, the location of the new pool will be interesting, but hardly conclusive. It either doesn't seem to prove much, or perhaps it will prove any theory. It is a little southeast of the trend through Abbyville - Lerado - Cunningham-Chitwood-Skinner from Reno County southwest through Barber County. It is a little southwest of the northwest trend (?) from Medicine Lodge through Skinner to Sun City.

The 41° gravity is normal for Ordovician production generally in Oklahoma-Kansas, yet the same formation is producing 26°-gravity oil only 1½ miles north. Boggs pool to the east is also low gravity. Do these variations have any significance? Who knows?

### HIGHLIGHTS OF WEEK'S DEVELOPMENTS

**SOUTH LOUISIANA.**—Humble Oil & Refining Co.'s new salt dome discovery in the Gulf of Mexico, 8½ miles off Grand Isle, Jefferson Parish, is now at 8,600 ft., continuing in the salt which was topped at 7,607 ft. A slight show of oil was encountered from 7,094-6,106 ft.

**TEXAS GULF COAST.**—Tidelands Oil Corp. and Superior Oil Co. jointly applied for permit to drill a test 3⅞ miles offshore, about 22 miles northeast of Port O'Connor, in the Gulf of Mexico. Sun Oil Co. 1 State, Section 232, Galveston Bay, Galveston County, Hanna Reef area, has set 10,200 ft. of 7-in. protection and is preparing to drill ahead. The test is 8 miles north of Port Bolivar and 7 miles southeast of Red Fish Reef production. Projected depth is 13,000 ft.

**EAST TEXAS.**—G. J. Hollandsworth 1 Crain extended gas-distillate production 4 miles north of Carthage field, Panola County, flowing 36,000,000 cu. ft. of gas a day, plus 32 bbl. of 63.6°-gravity distillate per million cubic feet. Pay is the lower Pettit. Drill-stem test below 10,000 ft. at Stanolind 1 Weekley, shows possible third pay, in Travis Peak sand, for Blackfoot field.

**WEST TEXAS.**—The Texas Co. 1 Pierce, southeastern Crockett County, killed gas flow with water, after blowing for 1 week. Observers believe it may be a duplicate of the deep-seated Ellenburger structure found in the Benedum discovery. Gulf Oil Corp. 1-E Wilson, 14 miles south of Midland, recovered oil and gas-cut mud on a drill-stem test in the Pennsylvanian, believed to be the Strawn. It will drill ahead to 12,500 ft., or to the Ellenburger.

**NORTH TEXAS.**—Kingwood Oil Co. drilled additional pay in the conglomerate in its Chico extension field, which was expected to reduce excessive gas-oil ratio. It flowed 130 bbl. of oil in 22 hours.

**ROCKY MOUNTAIN AREA.**—Superior Oil Co. of California apparently has a new Wyoming discovery at the 1 Parkinson, Albany County wildcat. Oil was recovered on test of the Tensleep sand and casing has been run for further tests. Continental Oil Co. found the Wall Creek sands hard and tight, but higher than expected, in the 1 Coles, Johnson County wildcat, Wyoming. Pure Oil Co. has run liner at its West Poison Spider producing depth record discovery. Extensive shows of oil are reported at the Texas Co.'s Big Wall, Musselshell County, Montana, wildcat.

# TEXAS GULF COAST

## New Discovery in La Bahia Area

HOUSTON.—A new discovery in the La Bahia area, approximately 1½ miles south of Goliad townsite, in Goliad County, has been opened by Overton Refining Co. 1 S. E. Cole, which flowed a potential gage of 4 bbl. of 41.7°-gravity oil per day with gas-oil ratio of 21,950. Production is from open hole at 5,550-66 ft. below the bottom of the 4½-in. drill pipe which was cemented at 5,550 ft. where it was stuck following a blowout. Total depth is 5,566 ft., with top of pay zone at 5,548 ft. This well is located in Block 33, Range 4, Goliad Town tract.

Potential gage of new sand discovery in the West Conroe area of Montgomery County has been announced by Sam Pattillo. The 1 R. L. Calfee, in the James McDillon Survey, Block 9, flowed 158 bbl. of 30.7°-gravity oil per day through a 10/64-in. choke with 720 psi. flowing pressure on the tubing and 960 psi. on casing.

Tide Water Associated Oil Co. 1 H. G. Nelson, in Lot 7, J. B. Fenn Survey, Abstract 215, is a link well between Sublime field proper and the northeast extension area in Colorado County. On initial gage the well flowed 125 bbl. of condensate and 2,750,000 cu. ft. of gas with 2,350 psi. tubing pressure. Shows of gas and condensate were reported from 8,515-45 ft. and 9,450-9,514 ft. Total depth is 9,514 ft. and 7-in. casing is cemented on bottom.

A new sand in the Frio series on the southeast flank of Manvel field in Brazoria County is being opened by Salt Dome Oil Corp. et al 2 C. W. Way et ux in Lot 38 of the Thomas Spraggins Survey, Abstract 366. Total depth is 5,871 ft., with 5½-in. pipe cemented at 5,865 ft. and perforated from 5,786-92 ft. where it cleans, flowing oil and wash water through 7/64-in. choke with 550 psi. flowing pressure on tubing.

J. H. Woodard, Jr., 1 Alexander Duessen opened new oil production off the southeast flank of the South Liberty dome in Liberty County, in David Minchey Survey. Drilled to total depth of 5,016 ft., this well flowed on final gage 121.5 bbl. of 35.8°-gravity pipe-line oil per day through a 10/64-in. choke, with 450 psi. flowing pressure on the tubing.

The 51 new locations for Districts 2 and 3 included 19 wildcat starts, 3 in Liberty; 2 each in Brazoria, Goliad, and Harris; and 1 each in Burleson, Chambers, Fayette, Lavaca, Matagorda, Montgomery, San Jacinto, Tyler, Victoria, and Wharton counties. Two oil sands were opened this week, one each in South Gillock and West Conroe fields, and nine wildcats were dry, one each in Bee, Brazoria, DeWitt, Jefferson, Lee, Matagorda, Refugio, Washington, and Wilson counties.

### TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Galveston County: New oil sand South Gillock field—Pan American Production 1 Eulies Nunez, in Blk. D, Lot 1 Kohfeldts Re-subd. of James Smith Sur., A-176, TD 9,037 ft., top sand 8,965 ft., perf. 8,956-66 ft., IP: 321 bbl. oil per day through 14/64-in. choke, GOR 2,207, TP 1,325 psi., grav. 39.5°.

Montgomery County: New oil sand West Conroe field—Sam Pattillo 1 R. L. Calfee, in Jas. McDillon Sur., Blk. 9, TD 4,713 ft., top sand 4,594 ft., perf. 4,596-4,602 ft., IP: 158 bbl. oil per day through 10/64-in. choke, GOR 710, TD 720 psi., CP 960 psi., grav. 30.7°.

### TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Bee County: Smith-Story-Wood Corp. 1 Pearl Algea Meitzgen, in Bee Co. Sch. Lands, Sur. 19, 6 mi. W-NW from Beeville, dry, TD 4,459 ft.

Brazoria County: The Texas Co. 1 Neal Giesecke, in J. H. Bell Sur., south of production on West Columbia dome, dry, TD 8,146 ft.

DeWitt County: Sun Oil Co. 1 E. T. Clark, Jr., in Jose Santos Lge. Grant, 7 mi. SE of Yorktown, 3,750 ft. NW of Goliad county line, 5 mi. NE of Slick-Wilcox field, dry, TD 7,674 ft.

Jefferson County: Sun Oil Co. 2 Broussard & Herbert, in T&NO Sec. 273, in La-Belle area, dry, TD 9,041 ft.

Lee County: Standard Oil Co. of Texas 1 J. A. Biggers, in S. Marshall Sur., A-212, 3 mi. SE of Lexington townsite and 7 mi. S of Tanglewood area production, dry, TD 7,326 ft.

Matagorda County: Jergins Oil Co. 1 W. D. Cornelius, in Hy. Parker Sur., Sec. 17, 5 mi. NW of Markham townsite, dry, TD 7,157 ft.

Refugio County: Dan L. Clark & Rupert Cox et al 1 Mrs. Audrey Baumgartner & Mary F. Woodworth, in Power & Hewitson Sur., A-54, 3 mi. N-NW of Vidauri, dry, TD 6,515 ft.

Washington County: H. L. Hunt 1 Elton W. Pieper, in C. Givens Lge., A-48, and C. Carmona Lge. A-125, 1 mi. W of Phillipsburg and 4 mi. S of Brenham townsite, dry, TD 9,505 ft.

Wilson County: Henshaw Bros. & E. H. Smith & O. R. Mitchell 1 William Fraks, in Maria Calvillo Grant, A-22, 4 mi. SW of Floresville, dry, TD 6,051 ft.

# MISSISSIPPI

## New Completion in Cranfield Field

JACKSON.—In Cranfield field of Adams County, The California Co. 1 Cranfield Unit 3, Tract 13, Section 45-7n-1w, has been completed as a gas-condensate producer, with initial gage of 582 bbl. of condensate and 7,500,000 cu. ft. of gas per day, through a ½-in. choke. Gravity 53.2°. Gas-oil ratio 12,900. Total depth is 10,294 ft., with perforations for completion at 10,215-54 ft.

Burden-Kemp-Gilster 3 Elizabeth Stanton, 91-7n-2w, in La Grange field of Adams County, was drilled to a total depth of 6,285 ft., and completed for an initial production of 172 bbl. of oil per day, flowing through a 10/64-in. choke, tubing pressure 350 psi., casing pressure 350 psi., gravity 41.3°. Production is through perforations at 6,223-27 ft. in the Baker sand.

Also in La Grange field, Adams County, W. J. O'Brien 2 Fannie Green, 8-6n-2w, flowed 125 bbl. of oil per day through a 10/64-in. choke, gravity 39.5°. Total depth is 6,250 ft., and production is through perforations at 6,197-6,201 ft.

The California Co. 1 Luther Bowman et al, 20-6n-8e, in Mallalieu field, Lincoln County, flowed 600 bbl. of 38.4°-gravity oil per day through perforations at 10,390-95 ft. and 10,423-67 ft. Total depth is 10,491 ft.

Yellow Creek field of Wayne County received two producers; Humble Oil & Refining Co. B-5 G. M. & O. Land Co., 24-9n-8w, pumped 204 bbl. of 20.4°-gravity oil per 24 hours, 5 per cent b.s and w., through perforations in the Stanley sand, top at 5,045 ft. and base 5,105 ft. Humble's B-3 E. L. West, 24-9n-8w, pumped 192 bbl. of 20.4°-gravity oil per day through perforations from 5,086 to 5,145 ft.

Three wildcat starts were reported this week, one each in Holmes, Jefferson, and Simpson counties, while only one development location was reported in Mallalieu field, Lincoln County. Two wildcat failures were completed, one each in Leake and Sharkey counties.

### MISSISSIPPI WILDCAT FAILURES

Leake County: J. N. Buchanan et al 1 J. S. Luke et al, NE SE 28-9n-8e, dry, TD 5,522 ft. Marine Tuscaloosa 4,846 ft., Massive sand 5,038 ft., Comanche 5,150 ft.

Sharkey County: J. K. Wadley et al 1 Cameron Estate, NW NW 4-13n-6w, dry, TD 4,023 ft. Lower Cretaceous 3,810 ft. (Travis Peak).

# SOUTHWEST TEXAS

## Texas Co. Completes Corpus Christi Bay Test

CORPUS CHRISTI.—The Texas Co. 1 State Tract 9, in State of Texas Tract 9, in Corpus Christi Bay, 3¼ miles southwest of Ingleside, Nueces County, has been completed to open a new gas-condensate pool. On potential gage the well flowed 121 bbl. of condensate per day and 3,200,000 cu. ft. of gas per day, through a 5/32-in. choke, working pressure 6,275 psi., and shut-in pressure 7,250 psi., gravity 54.6°. On open flow this well gaged 11,500,000 cu. ft. of gas per day.

Humble Oil & Refining Co. B-4 John G. Kenedy, wildcat in northern Kenedy County, 2,830 ft. east-southeast of the company's B-3 Kenedy discovery gas well 5 miles northeast of Sarita, was cratered and still blowing dry gas, and the operators were preparing to drill a relief well to 2,400-ft. level at which the well blew out. The blowout came when the well was at total depth of 2,402 ft., and the hole soon cratered, causing the derrick and rig to be lost in the crater.

Jarman-Hill-Drews 1 Alexander Estate, 2½ miles south of Cedar Creek, in Bastrop County, tested a little oil through perforations at 1,678-84 ft., with no pressure. Operators moved off drilling rig to move on a light rig and swab for production. Total depth is 1,972 ft., with 5½-in. casing at 1,724 ft. This well is located in the south corner of J. Billingsley Survey.

Skelly Oil Co. 1 Richard King, wildcat in western Nueces County, set 5½-in. casing to 5,973 ft., and are preparing to run a production test. Total depth is 6,213 ft. and is located in Section 27 of the Richard King Farm lots, 3 miles west of Agua Dulce field, and 2 miles south of Richard King field.

Potential gage has been run in the Baldridge & King 3 Benita Diaz, new producer southwest of the recent "Coastal" field discovery of southeastern Starr County, in Porcion 38. It flowed 79 bbl. of oil per day through a ⅛-in. choke, with 20 per cent water, gas-oil ratio 400. Production is through perforations at 5,870-79 ft.

There were 28 new locations reported for Districts 1 and 4, with 10 being wildcat starts, 2 each in Brooks and Duval; and 1 each in Bexar, McMullen, Milam, Webb, Zapata, and Zavala counties. One successful wildcat opened a gas-condensate pool in Corpus Christi Bay, Nueces County, and seven wildcats were dry, two in Duval, and one each in Bastrop, Guadalupe, Kenedy, Nueces, and Starr counties.

### SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCAT

Nueces County: New gas-condensate pool—The Texas Co. 1 State Tr. 9, in State of Texas Tract 9, in Corpus Christi Bay, 3¼ mi. SW of Ingleside, top pay 10,675 ft., TD 11,563 ft., perf. 10,675-88 ft., IP: 11,500,000 cu. ft. gas per day on open flow; on 5/32-in. choke flowed 121 bbl. of condensate per day and 3,200,000 cu. ft. gas per day, working pressure 6,275, shut-in pressure 7,250 psi., grav. 54.6°, no water.

### SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Bastrop County: C. J. Brown 1 J. J. Ferguson et al, 4 mi. N of Lytton Springs, in James Doyle Sur., dry, TD 1,669 ft.

Duval County: Gravis & Mitchell 2 National Oil Co., in Sur. 241, on NW flank of Palangana Salt Dome, 6 mi. N of Benavides, dry, TD 5,026 ft.

E. B. Cox & Jake L. Hamon & Geo. Coates 1 V. Chapa, in A. C. Chapa Sur. 10, 13 mi. NW of Realitos, 2½ mi. SE of Rancho Solo field, dry, TD 2,525 ft.

Guadalupe County: Butler Oil Co. 1 Hugo Borman, in A. M. Esnaurizar Sur., Sec. 208, 3 mi. SW of San Geronimo, dry, TD 1,163 ft.

Kenedy County: Humble 3 Sauz Ranch-Tenerias Pasture, in Share 64, San Juan de Carricitos Grant, 1,000 ft. N of Willacy-Kenedy county line, 13 mi. NE of Raymondville, dry, TD 13,509 ft.

Nueces County: Phillips Pet. Co. 1 Eulah, in Sec. 6, Geo. H. Paul's Subd. of Driscoll Ranch, 6 mi. S-SE of Robstown, 3 mi. W of Shield field, dry, TD 7,015 ft.

Starr County: Humble 4 E. Block Hrs., in Los Retachez Grant, ¾ mi. NW of Sun field, dry, TD 7,618 ft.

## N. CENTRAL TEXAS

### Chico Well to Make Another Drill-Stem Test

WICHITA FALLS.—Kingwood Oil Co. 1 Garrett, north extension well to Chico field of Wise County, had good prospects of reducing its excessive gas-oil ratio, in drilling additional pay to 5,370 ft. Operators were to run electrical survey and make another drill-stem test.

Previously the well had flowed 70 bbl. of oil in 8 hours, through 22/64-in. choke, from sandy conglomerate pay at 5,285-5,320 ft., then total depth. Gas-oil ratio on the test ran an estimated 3,800 cu. ft. A 22-hour gage from the same interval yielded 130 bbl. of oil through ¼-in. choke.

On the southwest edge of Chico field, Cities Service Oil Co. 1 Berry, Thompson Survey, completed for 50 bbl. of oil a day through ¾-in. choke, from pay at 5,134-5,260 ft. Cities Service was reported starting its 1 R. O. Garrett, in the same survey, and north of its 1 Flowers.

New exploratory tests scheduled included a 7,000-ft. Ellenburger test in southwestern Fisher County, 1½ miles southeast of Claytonville, in Section 207, Block 3, H&TC Survey, by H. H. Coffield, of Rockdale, Tex. Rotary tools will be used.

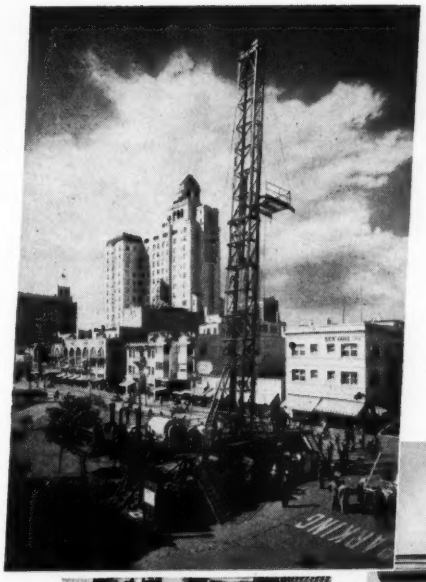
In Montague County, Moran Brothers 1 W. R. Williams, J. W. Kelly Survey, 4 miles southwest of St. Jo, is planned to 7,200 ft. Failures in the area are Nu-Enamel Oil Corp., which drilled to 7,132 ft., 1¾ miles northeast of the 1 Williams location, and Sinclair Prairie Oil Co., which drilled to 8,000 ft., 1 mile west. Sinclair's well had top of the Caddo at 6,459 ft., Viola at 7,415 ft., and the Simpson at 7,937 ft.

In northwest Montague County, northeast of Stoneburg, Louis Sikes 1 Fowler, R. M. Davis Survey, topped Bend conglomerate at 6,053 ft., and was drilling ahead below 6,110 ft., with no shows. Two miles northwest of Montague, Continental Oil Co. 1 Wood, F. J. Bellows Survey, recovered 50 ft. of oil-cut mud, with no water, in Bend conglomerate at 6,242-58 ft. It continued drilling ahead. Two miles south of Belcherville field, C. U. Bay 1 Cole, Block 69, J. H. Belcher subdivision, took a 1-hour drill-stem test of the Strawn sand from 5,167-77 ft., and recovered 10 ft. of drilling mud, with no shows. Operators drilled ahead.

Young County received three new wildcat locations. In northern Young, 4 miles south of Olney, Macoil Corp. 1 Rothell was to be drilled 330 ft. from south and west lines of the east half of Block 214, TE&L Survey. Contract depth is 4,900 ft. Ten miles west of Graham, Perkins-Prothro Co. 1-A fee, 2,196 ft. from south and east lines of Block 2,931, TE&L Survey, was to test the Caddo and Mississippi limestones, with no contract depth set. Two miles north of the new Holbert-Caddo field, W. S. Ranch Co. of Fort Worth 1 Holbert, Block 758, TE&L Survey, is planned to 5,000 ft.

**NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS**

Callahan County: Star Oil Co. 2 Taylor-Ramsey, Sec. 319, Blk. 5, SPRR Sur., 5 mi. S Putnam, flowed 163 bbl. 42.5°-grav. oil in 25 hours, casing pressure 1,325 psi., tubing 1,025 psi., GOR 1,473 cu. ft., Ellenburger 3,927-53 ft., TD, elev. 1,696 ft.

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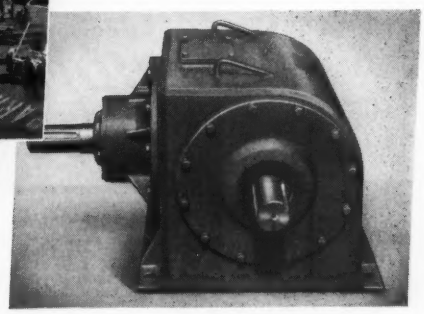

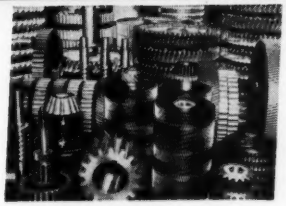

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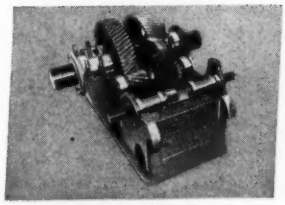

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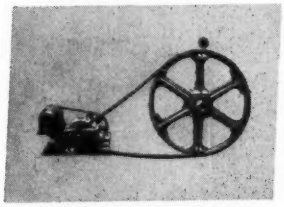

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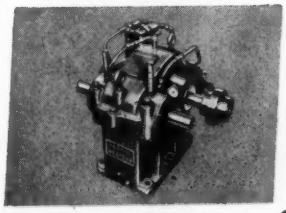

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Jack County: Cox Drilling Co. 1 J. T. Roney, Sec. 3,326, TE&L Sur., 10 mi. SE Antelope, flowed 37½ bbl. 42°-gravity oil 1½ hours, 1/34-in. choke, casing pressure 990 to 650 psi., tubing 700 to 500 psi., GOR 1,200 cu. ft., Caddo 4,580-4,602 ft., TD.

**NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES**

Archer County: L. T. & Bobby Burns 1 M. Kilcrease, Sec. 1,836, TE&L Sur., 8 mi. SW Windthorst, dry, TD 3,200 ft. in shale.

S. F. Hutcheson 1 Julius Foerster estate, J. W. Harris Sur., 6 mi. SW Archer City, dry, TD 1,425 ft.

Clay County: Shell Oil Co., Inc., 1 J. J. Howell, Sam Augustin Sur., 1½ mi. N joy, dry, TD 4,675 ft., sand with show oil 4,533-52 ft.

Coleman County: Ungren & Frazier 1 J. P. Morris, D. W. Cloud Sur., 4 mi. N Coleman, dry, TD 2,446 ft., Morris sand 2,380 ft.

Cooke County: Anderson & Guffey 1 F. B. Bordovsky, A. C. C. Bailey Sur., 3 mi. E Gainesville, dry, TD 2,550 ft., sand 2,401-31 ft.

Dalport Oil Corp. 1 C. C. Chism, Sec. 9, SPRR Sur., 3 mi. S Bulcher, dry, TD 1,331 ft.

Dalport Oil Corp. 2 C. C. Chism, SPRR Sur., 3 mi. S Bulcher, dry, TD 1,362 ft.

Eastland County: P. T. Sharples 1 Matthews, Sec. 14, H&TC Sur., 3½ mi. SE Eastland, dry, TD 3,687 ft., Caddo 2,720 ft,. Ranger sand 3,171 ft., Barnett shale 3,542 ft., Ellenburger 3,637 ft.

Fisher County: Humble Oil & Refining Co. 1 J. T. Crowley, Sec. 42, Blk. 2, H&TC Sur., 3 mi. S Rotan, dry, TD 7,085 ft., Ellenburger dolomite 6,660 ft., Granite Falls 7,074 ft., elev. 1,961 ft.

Hunt Oil Co. 1 B. F. Kemp, Sec. 54, Blk. 1, H&TC Sur., 3½ mi. NE Sylvester, dry, TD 3,760 ft., Noodle Creek 3,005 ft., Swastika sand 3,725 ft.

West Central Drilling Co. 1 E. W. Johnson, Sec. 196, BBB&CRR Sur., 5 mi. W Hamlin, dry, TD 3,144 ft., Saddle Creek 3,070 ft., Flippen 3,106 ft.

Johnson County: Cal-Tex Oil Co. 1 C. P. Dahn, Dyer Nummer Sur., 5½ mi. NW Cleburne, dry, TD 1,370 ft. in sand.

L. J. Cowley et al 1 McDonald, T. F. Edwards Sur., 3 mi. SE Cleburne, dry, TD 1,971 ft. in shale.

Jones County: Humble Oil & Refining Co. 1 Mrs. E. L. Phillips, Sec. 333, Harrison CSL, dry, TD 3,340 ft.

Manley Bros. 1 Ann Rutledge, Sec. 46, Blk. 16, T&PRR Sur., 6½ mi. SE Hawley, dry, TD 2,295 ft., Flippen lime 1,877 ft., oil show 2,047 ft.

Montague County: Louis Sikes 1 M. Fowler, R. M. Davis Sur., 3½ mi. N7 Stoneburg, dry, TD 6,188 ft. in shale, Caddo 6,053 ft.

Shackelford County: Texas Crude Oil Co. et al 1 M. E. Gurney, Sec. 49, BAL Sur., 1½ mi. SW Ibex, dry, TD 4,473 ft., Caddo 3,490 ft., Ellenburger 4,437 ft.

Taylor County: Hickok & Reynolds 1 G. F. Rhodes, Sec. 16, Blk. 5, T&P Sur., 10 mi. S Merkel, dry, TD 3,325 ft. in lime.

Throckmorton County: R. Olson Oil Co. 1 L. E. Everett, Sec. 1,621, TE&L Sur., 5 mi. S Throckmorton, dry, TD 4,520 ft., Caddo 4,191 ft., light odor.

P. B. Scott 1 J. B. Matthews, Sec. 67, Comanche Indian Reservation Sur., 10 mi. SW Throckmorton, dry, TD 1,048 ft.

Wichita County: Akin & Dimock 1 S. P. Cunningham, Blk. 15, League 1, Denton CSL, SW Wichita Falls townsite, dry, TD 4,810 ft.

Young County: Howell & Howell 1-A Nellie Prideaux, A. McMullen Sur., 7 mi. NW Markley, dry, TD 4,490 ft., Caddo 4,468 ft.

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## SOUTH LOUISIANA

### New Gas-Condensate Pool In Plaquemines Parish

NEW ORLEANS.—Sid W. Richardson E-I Delacroix Corp. has opened a new gas-condensate pool in the Point a la Hache area of Plaquemines Parish. The discovery is located in Section 34-16s-14e. Drilled to a total depth of 11,313 ft., the well flowed an initial gage of 85 bbl. of condensate per day and 4,350,000 cu. ft. of gas per day through a ¼-in. choke. Gas-condensate ratio was 51,188, and tubing pressure flowing 3,990 psi., and shut-in pressure 4,000 psi. Gravity 53.4°. Top of the producing sand was topped at 10,196 ft., and pipe was perforated from 10,196-10,207 ft. for completion.

A new deep pay zone for Lake Mongoulois field, St. Martin Parish, has been opened by The Texas Co. 8 State-Lake Mongoulois State Lease 303, in Section 4-10s-9e. Total depth is 10,619 ft. in sidetracked hole, the original hole being drilled to 10,800 ft. On initial flow test, the well flowed 209 bbl. of 25.8°-gravity oil per day through a 10/64-in. choke with flowing pressure on the tubing of 1,000 psi. Gas-oil ratio 592. Production is through perforations at 10,968-11,008 ft.

Gulf Refining Co. opened a new field in the Little Lake area of Jefferson Parish, 2 miles south of Humble Oil & Refining Co.'s Little Temple discovery, on the east side of Little Lake. The A-1 Louisiana Land & Exploration Co., in Section 5-18s-23e, was drilled to a total depth of 12,072 ft. where it started blowing gas and drill pipe became stuck. Hole was plugged back to 9,280 ft. and sidetracked to a present total depth of 10,000 ft. Production pipe was cemented at 9,987 ft. and perforated from 9,889-94 ft. where it flowed an initial gage of 142 bbl. of high-gravity oil through a 5/32-in. choke in 24 hours. Flowing pressure on tubing was 3,350 psi., and a shut-in pressure of 3,700 psi.

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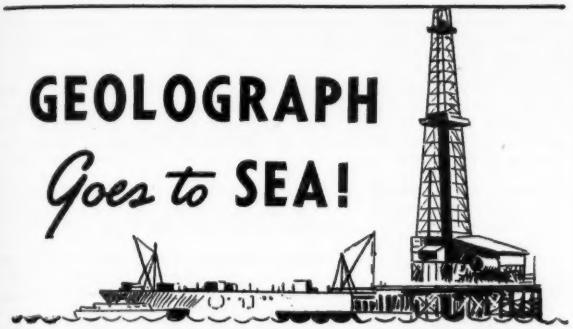

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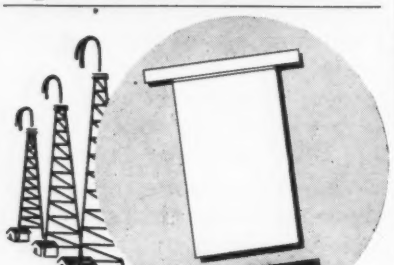

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sured of another gas discovery in the Mud Lake area of Cameron Parish. It is 1 Abel West Heirs in Section 7-15s-10w, 4 miles southeast of Mud Lake gas-condensate field. The well flowed, on an 8-hour test, at the rate of 3,361,000 cu. ft. of gas and 54 bbl. of condensate, 53.2°-gravity, per day, through a 12/64-in. choke. Total depth is 11,611 ft., and 5½-in. casing is cemented to 10,977 ft.

The 13 new locations included 2 wildcat starts, 1 each in Acadia and Beauregard parishes. Two wildcat failures were reported, one each in Beauregard and St. Mary parishes.

**SOUTH LOUISIANA WILDCAT FAILURES**

Beauregard Parish: Roeser & Pendleton, Inc., 1 Lutcher Moore, SE NE 16-6s-12w, in Bancroft area, dry, TD 8,595 ft.

St. Mary Parish: The California Co. 1 J. J. Greenwood, 46-16s-13e, 6 mi. E of Bateman Lake production and 3 mi. S of Lake Paloudore, dry, TD 11,908 ft.

## EASTERN TEXAS

### Henderson County Wildcat Drills Ahead After Oil Show

DALLAS.—W. B. Hinton 1 J. M. Criswell, Travis Peak test in the Athens area of Henderson County, C. M. Walters Survey, was drilling at 8,460 ft. in limestone, after running tests on an oil show in the Bacon limestone. A drill-stem test between packer at 8,047 ft. and 8,072 ft., using 1,000 ft. of water cushion, produced a slight blow immediately that lasted 15 minutes and died. The tool was open 29 minutes, when the tool was picked up and packer reset. Initial and final bottom-hole pressures were 690 psi. and 770 psi., respectively.

On the second test the tool was open 12 minutes, having initial and final pressures of 770 and 810 psi. With the packer again reset, and the tool open for another 12-minute period, it produced a slight blow in 1 minute, gradually increasing to a fair, steady blow in 10 minutes, then started to die down. When pipe was broken down, recovery was water cushion plus 690 ft. of gas-cut salt water, of which the top joint was cut with oil and gas. Initial and final pressures were 810 psi. and 985 psi. Shut-in bottom-hole pressure was 3,678 psi.

T. D. Humphries 1 E. B. Tuggle, 4 miles east of Kemp in Kaufman County, was drilling below 6,967 ft. in shale and sand. Cores from 6,666-76 ft. recovered shale and 1 ft. of crystalline limestone having gas odor and slight taste. Sample tops released were Pettit 6,660-70 ft., and Travis Peak 6,745-64 ft.

In Leon County, Byrd-Frost, Inc., 1 J. L. Nash, A. C. Bullock Survey, 2½ miles south of Leona, was drilling at 7,375 ft. in shale. Cores from 7,122-30 ft. recovered 8 ft. of hard, shaly nonporous sand, having very slight gas odor in the top foot. At 7,140-50 ft. the recovery was grey to white sand, being slightly porous and having slightly salty taste.

J. E. Devant and Maner Graham 1 K. Tideman & Co., new Edwards lime test 5 miles northeast of Calvert, Robertson County, was drilling below 3,220 ft. in sand and shale. William Herbert Hunt Trust estate made location for 1 O. W. Leopard, in the John Hallum Survey, 7 miles east of Henderson, Rusk County, to test the Travis Peak. Humble Oil & Refining Co. 1 Everett Wintters, William Price Survey, is a new Travis Peak operation ¾ mile southeast of Red Springs, in Smith County. It was drilling below 2,000 ft.

Humble's 1 Kate E. Sackett, 1½ miles south of Flint, Smith County, was drilling in shale with streaks of sand at 5,905 ft. Humble 1-C Pickering, Shelby County, was making hole at 9,244 ft. in shale and lime.

In Gregg County, Warren Oil Corp. 1 Lawrence Unit, Alexander Ferguson Survey, 2½ miles west and slightly south of Longview, was drilling at 5,300 ft. It had Georgetown limestone at 3,407 ft., and Austin chalk from 3,375-3,460 ft.

**EAST TEXAS (DISTRICTS 5 & 6) SUCCESSFUL WILDCAT**

Wood County: Billy Bridewell & F. R. Jackson 1 G. K. McKenzie, Jason Sherman Sur., 1 mi. NE Alba, pumped 50.1 bbl. 15.6°-grav. oil a day, top sub-Clarksville 4,028 ft., TD 4,123 ft., elev. 437 ft., producing from open hole, casing set to 4,027 ft.

**EAST TEXAS (DISTRICTS 5 & 6) WILDCAT FAILURE**

Limestone County: R. J. R. Oil Corp. 1 Jones heirs, R. Flippen Sur., 1½ mi. NW Kosse, dry, TD 3,695 ft., Austin 2,841 ft., Eagleford 3,126 ft., Woodbine 3,402 ft., Georgetown 3,501 ft., elev. 517 ft., soft lime 3,691 ft., lost circulation.

## APPALACHIAN FIELD

### First Clinton Test Seen As Important

PITTSBURGH. — On Chestnut Ridge in Georges Township, Fayette County, southwest Pennsylvania, Manufacturers Light & Heat Co. is drilling No. 8 Barton down to the Clinton sand. This test was drilled through the Oriskany sand; topped at 7,303 ft., and it had only a small showing of gas in that formation as well as only a small showing in the Onondaga chert although it was high on structure correlated with other wells in the area. This will be the first Clinton test on the structure and is of great importance.

On Negro Mountain anticline in Shade Township, Somerset County, the wildcat of Peoples Natural Gas Co. on R. F. Grove

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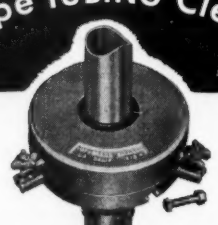

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farm topped the Tully lime at 7,860 ft. from a surface elevation of 2,343 ft. or datum 5,517 ft.

In Amwell Township, Washington County, Manufacturers Light & Heat Co. completed a test on Herschel C. Cowen farm good for 1,247,000 cu. ft. of gas with the Dunkard sand topped at 1,020 ft.; gas 1,045-48 ft.; gas 1,057-59 ft., total depth 1,061 ft.

New locations for the week totaled six and were in Kiskiminitas, Kittanning, and South Buffalo townships, Armstrong County; Allegheny and Bell townships, Westmoreland County.

On Briery anticline in Portland district, Preston County, West Virginia, William E. Snee, Orville Eberly, et al are drilling at 8,197 ft. in the Clinton wildcat on Virginia Cuppett farm. The Oriskany sand was topped at 5,628 ft. and, from the present depth in the anhydrate, it is expected that the red sandstone will be reached at 8,500 ft. and the white Medina at 8,700 ft. In Kingwood district, Hope Natural Gas Co. is drilling in the Injun sand at 1,021 ft. in the wildcat on Frank Barlow farm.

In Logan district, Logan County, Columbian Carbon Co. completed 1,056 Island Creek Coal Co. good for 1,750,000 cu. ft. of gas with the Big lime 1,644-1,875 ft.; gas 1,860-73 ft.; acidized; rock pressure 535 psi. 96 hours; total depth 1,882 ft.

In Baileysville district, Wyoming County, United Producing completed two fair gas wells on W. M. Ritter Lumber Co. with No. 1,477 gaging 1,929,000 cu. ft. after shooting the Berea (3,843-59 ft.), total depth 3,870 ft., and No. 1,484 good for 2,032,000 cu. ft. of gas from the Berea after shot, total depth 3,664 ft.

## ROCKY MOUNTAIN

### Apparent New Discovery in Albany County, Wyoming

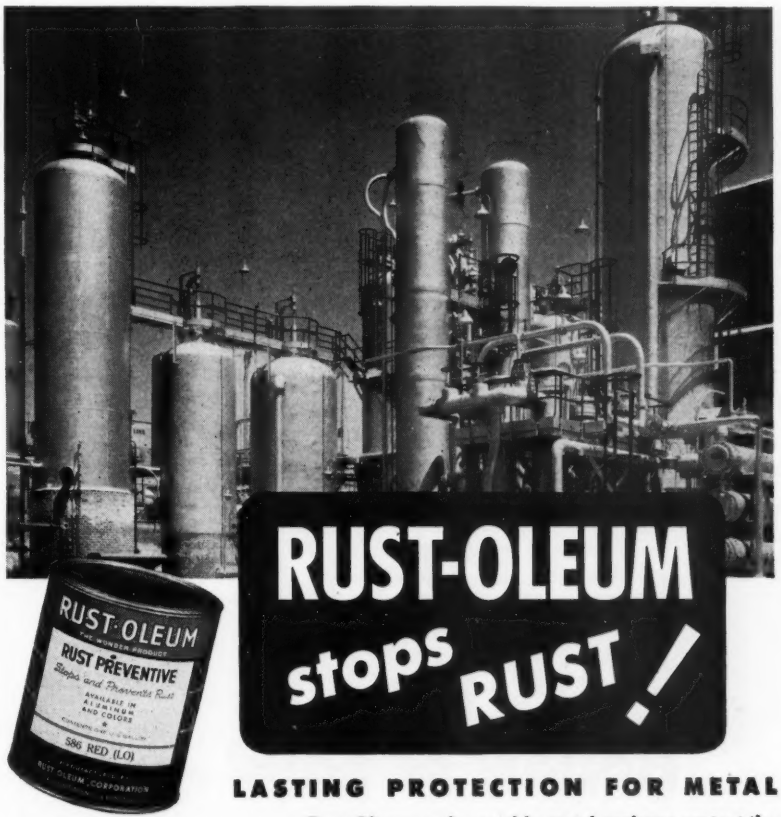
DENVER. — Casing has been cemented and is now being perforated by Superior Oil Co. of California at its Little Laramie wildcat at 1 Parkinson, SE SE NE 5-16n-75w, Albany County, Wyoming, and the well is apparently a new discovery in the Tensleep formation. Estimates following drill-stem test of the Tensleep rate the well good for 400 bbl. of 22°-gravity oil daily, but accurate gages have not been made. The well topped the Tensleep at approximately 3,725 ft. and found saturation in the sand at 3,741 ft. On drill-stem test at 3,740-64 ft. the well made 1,152 ft. of oil with 15 ft. of mud in 1 hour. On a subsequent test between 3,740-84 ft. the well made 330 ft. of oil and 1,240 ft. of oil and water in 1 hour. Seven-inch casing has been cemented at 3,824 ft., total depth, and the lower zone perforated for testing.

This discovery is located 2½ miles east of Superior's Herrick Dome field, which was a discovery in the Tensleep last year. The California Co., which has a joint interest in Little Laramie operations, drilled a well at 1 Bath, ½ mile southeast of the discovery, in 1936 and this well found all formations dry. The well was deepened in the Tensleep by Superior and California last year, but failed to find production. It is probable that the producing area of Little Laramie field will be small.

Hard, tight Wall Creek sand has been found by Continental Oil Co. in its important Taylor Sussex wildcat at 1 Coles, NW NW SE 17-42n-78w, Johnson County. The well is now drilling below 6,537 ft., in shales below the first Wall Creek sand. Top of the first Wall Creek was found at 6,358 ft. and on drill-stem test at 6,359-85 ft. the well made 70 ft. of mud. This well is being drilled on a seismic high 20 miles north of Salt Creek field. An interesting feature of the well is the fact that the Wall Creek sands are more than 800 ft. higher than expected by Continental as a result of the shooting. This is expected to encourage drilling on blocks held by other operators on the west side of Powder River basin. The Continental wildcat is scheduled to test the Sundance, but may be drilled to the Tensleep. Location of this structure north of Salt Creek field, which has produced since 1910 from the Wall Creek sands, has made the test of great interest to Rocky Mountain oil operators.

Liner has been run at Pure Oil Co.'s record-depth producing discovery at West Poison Spider, west of Casper. The well is at 14,309 ft., total depth, and flowed an average of 34 bbl. of 44°-gravity oil per hour 10 days ago on test from the Frontier sand. The well is located in the C NW SE 11-33n-84w, Natrona County, Wyoming. Seven-inch casing was cemented at 13,791 ft. when saturation was encountered in a sand at around 13,800 ft., and the liner has been run through this section to the top of saturation at 14,191 ft. After cement has set, the well will be tested in this lower zone and if production is not sufficiently high the zone at 13,800 ft. will be tested. Exact correlation of formations has not been announced by Pure on this well. It is reported in Casper that Loffland Brothers, contractors of the present well, will move two heavy rigs into the West Poison Spider area for development drilling on the structure. Pure has not announced further locations and the report has not been confirmed.

It is reported from Billings that The Texas Co. has recovered more than 1,000 ft. of oil from the Amsden(?) formation on drill-stem test of 1 Northern Pacific "B," SE NE NW 19-10n-27e, in Musselshell County, Montana. This report has not been confirmed by Texas. The well reportedly made this production in the zone between 3,100-34 ft., and although formation tops have not been released by the operator, this zone is concluded to be in the Amsden. This wildcat well is located 22 miles south-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west of Texas' recently discovered Ragged Point field, which produces oil from the Kibbey formation (Big Snowy group), and Kibbey in the Big Wall test is expected at around 4,300 ft. The well is now at 3,134 ft., total depth, with the operator reaming hole.

**New operations.**—There were a total of 32 new locations in the Rocky Mountains this week, with 21 of the wells in Wyoming, 6 in Colorado, and 5 in Montana. Two new locations were made east of the Rocky Point area in Crook and Campbell counties in the northeastern section of Wyoming on the shoreline play of Powder River basin. These were Superior, Hunt, and Phillips 1 C. Smith-Government, SW SW SW 28-56n-68w, and R. R. Murray 1 Otis Roberts, NE SE NW 4-56n-68w, Crook County. Both wells will be drilled to the Newcastle (Muddy) formation at around 4,000 ft. These are the first wells to be drilled on the stratigraphic-trap possibilities in this area, which is 75 miles north of Mush Creek field where development drilling to the Newcastle is proving profitable. Two new locations have been announced by General Petroleum Corp. in Gooseberry field, Township 47n-100w, Park County, Wyoming. This is the first activity in this field since discovery by General Petroleum in 1937 and the field has been shut in since that time. In Colorado location has been announced by The Texas Co. for a second well on Maudlin Gulch, Moffat County. The well is 2 Unit, SE NE SE 27-4n-95w, ½ mile northwest of the discovery well, which was recompleted by Texas as a discovery last year on farmout arrangements with Frontier Refining Co. of Denver. The discovery well made an average of 90 bbl. of fluid per day, of which 70 bbl. were oil, from the Morrison between 6,061-6,229 ft. The well was drilled to Sundance at 6,350 ft., total depth, by Frontier in 1945. Other locations were for pool wells.

**WYOMING WILDCAT FAILURES**

Rocky Point, Campbell County: Pure 1 Unit, Lot 9, Sec. 34-56½n-69w, 6,375 TD, abnd., DST 5,420-46, 1 hour, oil-cut mud, Minnekahta 5,342, Minnelusa 5,407, elev. 3,891.

Big Sandy, Carbon County: Rocky Mountain Gas 2 Unit, SE NW NW 16-26n-86w, abnd., first Frontier 637, second Frontier 855, third Frontier 1,130.

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## Bienville Parish Well to Make Drill-Stem Test

SHREVEPORT.—Union Producing Co. and Pure Oil Co. 1 Nebo Oil Co., 30-14n-5w, Bienville Parish, drilled to total depth of 10,008 ft., ran electrical survey, and prepared to start testing back up the hole. It was planned to make a drill-stem test on a sand zone between 8,650-80 ft. While drilling, electric survey to 9,125 ft. showed sand at 8,645-80 ft., with porosity indicated from 8,660-72 ft. At that time a number of sidewall cores were made, without recovery, and operators drilled ahead without testing.

In De Soto Parish, west of Spider field, Kerr-McGee and E. E. Hurley 1 Frost, 14-11n-15w, swabbed dry to total depth of 6,492 ft. in the Travis Peak, and squeezed all perforations. On last report it was swabbing salt water with a show of oil from new holes at 6,093-6,104 ft., and 6,125-49 ft., in the Pettit. Kerr-McGee et al 1 Nabors-Rives, south of Mansfield in 30-12n-13w, had heavy rotary rig up and was drilling ahead below 1,500 ft. Nine-inch casing was set to 1,396 ft. Location is said to be on a seismograph prospect. North of Logansport field, Sugarfield Oil Co. 1 T. T. Tolson, 1-13n-16w, parted surface casing and was to skid the rig 500 ft.. west for another start. Total depth was 778 ft.

Roy L. Fisher et al 1 B. W. Marston, 14-16n-9e, is a new Tuscaloosa wildcat 2½ miles northeast of Lamar field in Franklin Parish. It was drilling below 3,070 ft., in Wilcox topped at 1,980 ft., by samples. Planned depth is 5,200 ft.

Continental Oil Co. 1 Pardee, 30-12n-6w, deep Natchitoches Parish test, reported a drilling break between 11,379-83 ft. Cores from 11,383-85 ft. recovered 6 in. of fine-grained, hard, nonporous mico sand, with no shows. Drilling continued at 11,432 ft., in the Cotton Valley.

The California Co. 2 Maxey, Ouachita Parish wildcat in 32-18n-1e, was drilling ahead below 7,357 ft. in Travis Peak. J. K. Wadley 1 W. O. Chennault, 2-16n-6e, Richland Parish, was waiting on cement. Total depth is unchanged at 5,141 ft. Thomason, Smith & Turner set surface casing at 850 ft. at the 1 E. Giaugue, 27-7n-14w, new 6,000-ft. test on the south edge of Blue Lake field, Sabine Parish. C. H. Osmond et al 1 Wilkerson, 15-12n-12e, Tensas Parish, was drilling below 7,625 ft. in the Austin section. J. D. Trimble and E. P. Watts 1 Trimble - Mabray - Somerset, 37-14n-12e, cored porous sand with slightly salty taste and no shows, from 8,124-29 ft. It had the Tuscaloosa Marine sand at 7,676 ft., by samples.

In Union Parish, Pan-American Production Co. 1 J. H. Albritton, 10-19n-1e, was drilling at 8,360 ft. in the Cotton Valley. In Webster Parish, Hunt Oil Co. 1 Burns, 16-23n-9w, was drilling ahead below 10,846 ft. in shale. Details were not available but it is thought to be in the Smackover.

In Arkansas, Houston Oil Co. 2 H. B. Gaughan, shallow wildcat in 34-13s-16w, Calhoun County, pumped 6 bbl. of oil and 12 bbl. of salt water from open hole at 1,980-2,006 ft. Pay is the Meakin sand topped at 1,987 ft.

H. L. Hunt 1 Elledge, 15-15s-21w, Columbia County, was drilling below 4,070 ft in Travis Peak. McAlester Fuel Co. 1 W. D. Black, 24-15s-21w, is a new test 4 miles west of Stephens field. It was waiting on cement after setting surface string. In Miller County, Carter Oil Co. 1 Gildon,

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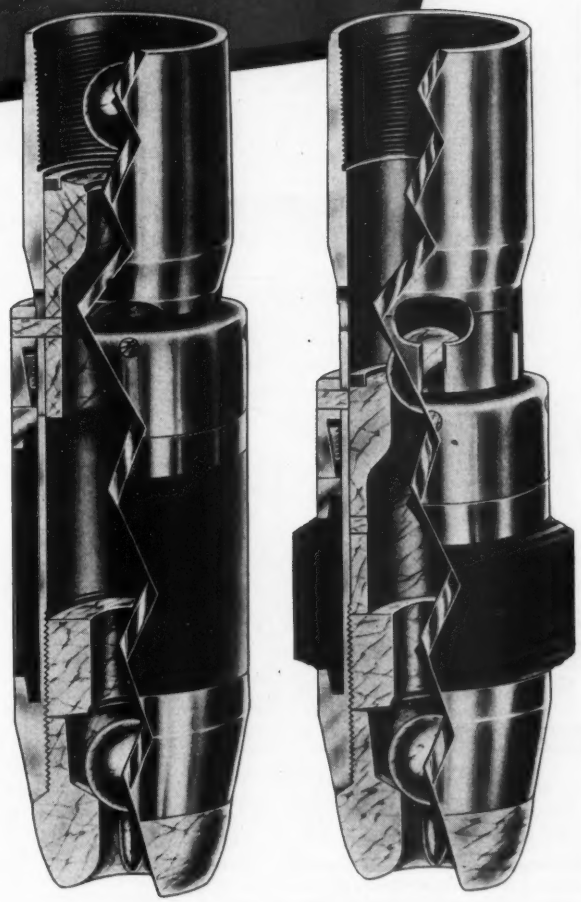

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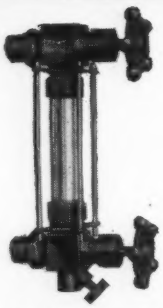

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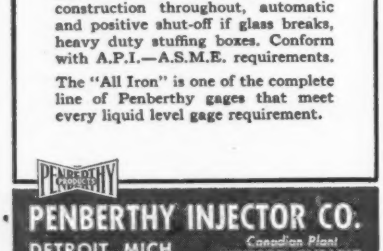

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22-16s-27w, was drilling in sand and shale at 7,043 ft. C. A. Kinard 1 Scales, 3-18s-17w, Union County, was drilling in Travis Peak at 3,996 ft. Sohio Petroleum Co. 1 Schilling, 12-16s-17w, was drilling at 5,948 ft.

**NORTH LOUISIANA WILDCAT FAILURES**

DeSoto Parish: Sugarfield Oil Co. 1 T. T. Tolson, SE SE 1-13n-16w, dry, TD 778 ft.

Jackson Parish: Delta Drilling Co. 1 Davis Bros., SE SE 26-16n-3w, dry, TD 7,858 ft., porous lime 7,230-50 ft., Travis Peak 7,616 ft., sand 7,730 ft., elev. 315 ft.

Union Parish: C. M. Bagley 1 T. W. Auger, 1,650 ft. from north and 1,660 ft. from west lines, SE corner 36-23n-1w, dry, 2,290 ft.

Pan American Production Co. 1 Frost, SW NE 9-20n-2e, dry, TD 2,506 ft., strat test.

**ARKANSAS WILDCAT FAILURES**

Hempstead County: El Capitan Oil Co. 1 A. R. Avery, SW NW NW 4-11s-23w, dry, TD 905 ft.

Lafayette County: Crow Production Co., Inc., 1 H. Moore, SE NW 25-16s-25w, dry, TD 5,010 ft., Nacatoch 1,520 ft., base Annona 2,311 ft., Tokio 2,662 ft., Paluxy 3,080 ft., Massive anhydrite 4,297-4,454 ft., James lime 4,974 ft., elev. 236 ft.

## MICHIGAN

### New High for Year In Well Completion

SAGINAW. — Twenty-three completions, scattered through 16 counties, marked a new high for the year in Michigan. The quickened seasonal pace continued with 21 new locations in 11 counties being reported.

Results, however, were mediocre, the completions including 5 oil producers, 3 gas wells and 15 dry holes, 8 of which were wildcats. New production ranged from 32 to 50 bbl. per day. Two of the producers, at 50 and 35 bbl., are in the Allegan County Salem field. A Pure Oil Co. completion in the new Beaver Creek field of Crawford County was producing 47 bbl. a day at 4,180 ft. The 30-bbl. wells are in the Midland-Greendale field and in Bentley of Gladwin County. The gas wells are in Clare County. Dry holes in proven areas were abandoned in Arenac, Mecosta, Tuscola, Osceola, Allengan, Newaygo, and Bay counties.

Among new locations are three each in Arenac, Clare, and Montcalm counties; two each in Van Buren, Isabella, Allegan, and Ogemaw; one each in Midland, Newaygo, Kent, and St. Clair.

**MICHIGAN WILDCAT FAILURES**

Allegan County, Dorr Township: George F. Lister 1 Joseph and Gladys Harnish, NW NW SW 18-4n-12w, dry and abandoned, TD 954 ft.

Gratiot County, Sumner Township: Socony-Vacuum Oil Co., Inc., 1 Gracia H. Cooley, NE SE SW 25-11n-4w, dry in Dundee, TD 3,253 ft.

Kent County, Byron Township: Rex Oil & Gas Co. 1 Russell DeVries, SW SW NE 2-5n-12w, dry in Traverse limestone, TD 1,882 ft.

Grand Rapids Township: Augie Busk 1 Elizabeth B. Cross, SE NW NE 23-7n-11w, dry in Traverse limestone, TD 2,214 ft.

Lapeer County, Deerfield Township: Clarence and Graham Wilcox 1 Louis Bodwin, SW SE SW 22-9n-10e, dry in Dundee, TD 3,702 ft.

Midland County, Geneva Township: Union Development Co. 1 Thomas J. Burns, SE SW SW 4-15n-2w, dry in Detroit River, TD 4,003 ft.

Montcalm County, Montcalm Township: Michigan Consolidated Gas Co. 1 Miller - Peterson - Palmateer, NW SE SW 2-10n-8w, dry, TD 1,141 ft.

Ottawa County, Tallmadge Township: Del Fortney and J. W. Lang Co. 1 George Kishman, SW NW SE 20-7n-13w, dry and abandoned, TD 385 ft.

## CANADIAN FIELDS

### Leduc Operations Still Hampered

CHATHAM. — Definite progress is being made in the efforts of the Petroleum and Natural Gas Conservation Board of Alberta, in conjunction with the operating companies, to control the situation created by the Atlantic 3 wild well in Leduc field. With available storage and pipe lines concentrated on the handling of the output, reduction is being gradually made in the quantity of oil accumulated in surface storage. Atlantic 3 drillpipe has been connected and a good proportion of the new oil flow is being tanked though cratering caused by oil and gas eruptions in the area sur-

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HOUSTON

rounding the well head is still in evidence.

Plans to return some of the oil to the formation through Atlantic 1 well have been abandoned, as the well pressure proved to high. As an alternative, water under heavy pressure is to be forced into the deep formation through Imperial 48, west of Atlantic 3, in the hope of shutting off the oil and gas flow temporarily and reducing the problem of handling the oil and gas. Work is proceeding on two relief wells, in which directional drilling is to be employed to reach the base of Atlantic 3 and divert the flow. V. J. Moroney of Imperial Oil is supervising, with G. W. Delancey and G. Cannon, wild-well experts from Houston, in consultation with conservation board officials.

The conservation board has announced that producing wells, shut down temporarily during the crisis, will share in returns from the uncontrolled production of Atlantic 3. Some 62 producers are shut in, and new completions are not being permitted to produce until the situation clears itself.

**Leduc drilling.** — Production figures for three new Leduc completions have been announced. Imperial 32, LSD 16, 22-50-26w4, finished at 5,333 ft., is good for 129 bbl. through 11/64-in. choke. Imperial 42, LSD 4, 36-50-26w4, with total depth at 5,304 ft., will make 147 bbl. through 11/64-in. choke. Imperial 47, LSD 7, 21-50-26w4, bottomed at 5,355 ft., is good for 144 bbl. through 11/64-in. choke. Imperial 45, LSD 10, 9-50-26w4, swabbed in at 5,419 ft., is testing. Imperial 60, LSD 11, 20-50-26w4, on drill-stem test at 5,064-5,140 ft., got 700,000 cu. ft. of gas with oil reaching the surface in 17 minutes, and is trying to restore circulation which was lost at 5,302 ft. Imperial 61, LSD 14, 27-50-26w4, on drill-stem test at 4,900-90 ft., got 350,000 cu. ft. of gas with oil reaching surface in 13 minutes. Two new Imperial tests have spudded, and new locations have been made for Imperial 70, LSD 3, 35-50-26w4, and Imperial 71, LSD 6, 26-50-26w4.

Home-Leduc 7, LSD 13, 21-50-26w4, finished at 5,439 ft., is testing.

In the Woodbend extension, north and west of the field, Imperial-Woodbend 2, LSD 4, 15-51-26w4, is deepening below 5,133 ft. after test at 4,902-88 ft. gave a slight gas blow. Imperial-Woodbend 3, LSD 9, 16-51-26w4, showed 1,400,000 cu. ft. of gas with 100 ft. of oil and 700 ft. of oil-cut mud at 4,912-96 ft. Test at 4,996-5,030 ft. gave 119,000 cu. ft. of gas with 450 ft. of oil and 180 ft. of mud. Imperial-Woodbend 4 has location at LSD 1, 16-51-26w4. Continental-Woodbend 3, LSD 12, 7-51-25w4, is changing rig at 2,623 ft.

**Turner Valley.** — In the Turner Valley north extension, Foothills Oil & Gas 27, LSD 9, 4-21-3w5, after faulting, has reentered the Madison limestone at 9,880 ft. and is below 9,919 ft. with early tests showing no oil, gas or water. Royalite 87, LSD 11, 9-21-3w5, in Kooteney formation below 9,257 ft., is developing another deep test.

**Lloydminster.**—Three new producers have been completed in the Alberta section of the Lloydminster field. Athlone 5, NW 6, 11-50-2w4, at 2,011 ft., has 35 bbl. daily. Granleduc 2, LSD 7, 14-50-2w4, at 1,975 ft., is pumping 55 bbl. Shamrock 1, LSD 6, 21-50-1w4, at 1,925 ft., is pumping 50 bbl. Imperial H. B. Blackfoot 2, LSD 2, 23-50-2w4, at 1,964 ft., has been bailing at the rate of 3 bbl. an hour.

In the Lone Rock area on the Saskatchewan side, Jupiter Oils of Toronto has started a development program in conjunction with Husky Refining Co. and has spudded Husky-Jupiter 2.

**Armena.**—A new exploratory test is being started by Imperial Oil in the Armena area, 30 miles southeast of Leduc and 10 miles northwest of Camrose. Imperial-Armena 1 has location in LSD 13, 10-48-21w4.

**Manyberries.**—Starting a new joint gas development program in the Manyberries area of southern Alberta, McColl Frontenac Oil Co. and Union of California have spudded 11A-21-2-3 in LSD 11, 21-2-3w4, McColl - Union 7C-25-7-5 has location in LSD 7, 25-7-5w4.

# KANSAS

## Rooks County Gets Good Extension to Barry Pool

HARRY GORE appears to have a good producer at 1 Ruder, SW SW NE 14-9s-19w, south of the Barry pool in Rooks County. Casing was set to 3,453 ft., 2 ft. above the Arbuckle, and hole drilled to a total depth of 3,460 ft. The well had 2,000 ft. of oil in the hole in 2 hours and after swabbing down filled 3,000 ft. in 1½ hours. Following a 500-gal. acid treatment, well swabbed 100 bbl. before being shut down.

Donald T. Ingling et al 1 Griffith, SW SW SW 33-19s-1w, McPherson County, has been completed as a gas well in the Mississippian, topped at 2,949 ft. and with gas showing at 2,985 ft. Hole was carried to 3,008 ft. and well was treated with 3,500 gal. of acid. Well capacity is about 500,000 cu. ft. of gas per day.

Stafford County is getting another oil-discovery well at Hinkle Oil Co., Apex Petroleum Co., and Benton S. Brooks 1 Sheppard, SW SW SW 34-21s-11w, 3½ miles east of the Max pool. Well is swabbing 3 bbl. of oil and 1 bbl. of water per hour from the Arbuckle at 3,463 ft. Casing was set at 3,465 ft. and total depth is 3,473 ft.

Two wildcats are preparing to test in the area at the northeast corner of Edwards County and the northwest corner of the panhandle portion of Stafford County. Max Cohen has set casing at 1 Bright, NW NW SW 1-24s-16w, northeast corner of Edwards County, to test a show of gas in the Arbuckle, topped at 3,952 ft., and shows of oil and gas in the Lansing-Kansas City. Lansing was logged at 3,598 ft.

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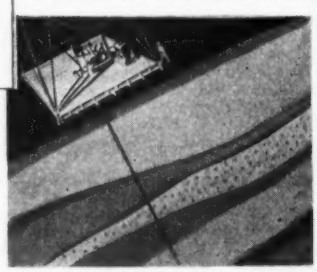

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Cromwell & Lewis are preparing to drill plug at 1 Bradbridge, SW SW SW 6-24s-15w, Stafford County, after setting casing to 4,020 ft. for a test of the Arbuckle and Lansing. A 30-minute drill-stem test of the Arbuckle at 4,017-24 ft. recovered 30 ft. of mud with a show of oil. A drill-stem test of the Lansing, 3,721-37 ft., with tool open for 1 hour, recovered 300 ft. of oil-cut mud.

For the week, a total of 70 new locations were reported with the top five counties in the following order: Barton, 10 new locations; Butler, 7; Rice, 6; Russell, 6; Ellis, 5.

**KANSAS SUCCESSFUL WILDCATS**

Reno County: Helmerich & Payne 1 Stuckey, SW SW SW 14-26s-6w, produced 51 bbl. of oil per day from Mississippian; Arbuckle 4,157 ft., TD 4,200 ft.

Rooks County: Texas Co. 1 Berland, NE SE SW 19-10s-19w, produced 159 bbl. of oil per day from Arbuckle, TD 3,807 ft.

**KANSAS WILDCAT FAILURES**

Barton County: Herndon Drilling 1 Schartz, NE NE NE 15-19s-12w, dry, TD 3,510 ft., Heebner 3,006 ft., Lansing-Kansas City 3,136 ft., Arbuckle 3,458 ft.

Ellis County: Texas Co. 1 Staab "A," NW NE SW 16-13s-17w, dry, TD 3,645 ft., Arbuckle 3,582 ft.

McPherson County: Barbara Oil Co. 1 Gray, SE SE NE 17-19s-1w, dry, TD 3,396 ft., Viola 3,392 ft.

Marion County: Hutchinson 1 Merilatt, NW NW SE 5-17s-4e, dry, TD 2,435 ft., basal chert 2,420 ft.

Pratt County: Rine Drilling 1 Fincham, NW NW SE 29-28s-12w, dry, TD 4,650 ft., Mississippi lime 4,241 ft., Viola 4,400 ft., Simpson shale 4,510 ft., Simpson sand 4,515 ft., Arbuckle 4,625 ft.

Rooks County: Barnett 1 Steeples, SE SE SW 22-9s-20w, dry, TD 3,834 ft.

Rush County: Cities Service et al 1 Kleinsteiber, NW NW SE 29-19s-18w, dry, TD 4,091 ft., Arbuckle 4,061 ft.

Russell County: Lauck 1 Templing, NE NE SE 17-15s-14w, dry, TD 3,351 ft., sandy conglomerate 3,312 ft., Arbuckle 3,324 ft.

Stafford County: Lindas et al 1 Sewing, SW SW NW 20-24s-14w, dry, TD 4,386 ft., Simpson 4,304 ft., Arbuckle 4,310 ft., no shows.

Sumner County: Smith & Carson 1 Boatright, NE NE SE 14-34s-2w, dry, TD 4,698 ft., Arbuckle 4,677 ft.

# ILLINOIS

## Richland County Gets Good McClosky Well

MATTOON.—In the area about 1 mile southeast of the Calhoun Consolidated field and about 6 miles southwest of the city of Calhoun, Russell P. Johnson 1 Hall Heirs, SE NW SW 17-2n-10e, is on production test of the McClosky following excellent recovery from drill-stem test. Production is from zones at 3,172-80 ft. and 3,185-89 ft. Total depth is 3,197 ft. Well flowed 1,110 bbl. of oil in the first 24 hours, and has not been acidized.

Operators are running electric log at Ashland Oil & Refining Co. and Calvert & Willis, 1 C. G. Miller, SW SW NE 9-3n-8e, Clay County. A drill-stem test of the Cypress at 2,657-72 ft. recovered 33 ft. of clean oil, 60 ft. of mud-cut oil, and 30 ft. of oil-cut mud. Total depth is 2,878 ft.

In White County, Indiana Farm Bureau and V. R. Gallagher 1 Hoerner, SW NE NW 28-3s-8e, has been completed in the McClosky for an initial production of 125 bbl. per day after an acid treatment of 1,000 gal.

**ILLINOIS SUCCESSFUL WILDCAT**

White County: Indiana Farm Bureau and V. R. Gallagher 1 Hoerner, SW NE NW 28-3s-8e, IP 125 bbl., McClosky, 3,417-25 ft., TD 3,448 ft.

**ILLINOIS WILDCAT FAILURES**

Clay County: National Associated Petro-


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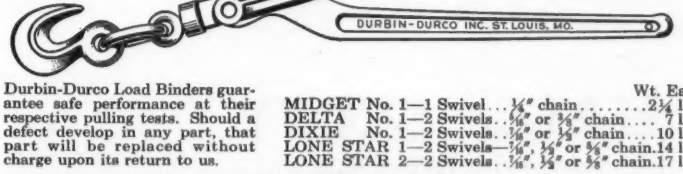


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leum Co. 1 R. R. Kemmerer, NW SE SE 34-4n-6e, dry, TD 3,100 ft.

Coles County: Ernest Zink 1 White, NW SE NE 12-12n-9e, dry, TD 960 ft.

Marion County: Paul Doran 1 O. F. Davis, NE SW NE 31-4n-1e, dry, TD 1,616 ft.

Clinton County: Walter Duncan and Talbot Oil Co. 1 Reinkensmeier, SE SW NE 24-2n-2w, dry, TD 1,398 ft.

## PERMIAN BASIN

### Texas Co. Test Is Attracting Attention

MIDLAND.—Southeastern Crockett County was drawing attention this week, at The Texas Co. 1 Victor I. Pierce, 998 ft. from north and 1,980 ft. from east lines, Section 5, Block O, Clarissa W. Brown Survey, and 21 miles south and slightly east of Ozona. Observers say there is a possibility of the same structure as Benedum field in Upton County. On an elevation of 2,248 ft., the 1 Pierce reported top of the Ellenburger at 11,470 ft., or 9,222 ft. subsea. The well blew out when cement was drilled out to bottom, at 11,839 ft. Previous to drilling cement plug, total depth was reported at 11,837 ft. On last reports the well had been killed with water to change a leaky control head.

The well first encountered high gas pressure in drilling to 11,837 ft., where circulation was lost and could not be regained. Operators then plugged back, and 5½-in. casing was cemented at 11,716 ft. The blowout occurred when cement was drilled from the casing.

Texas 1 Tom Smith, 660 ft. from south and 666 ft. from east lines of the west half of the same section, was drilling at 9,065 ft. in black, sandy shale. It is also an Ellenburger test.

Southeastern Coke County's first Ellenburger limestone producer, Seaboard Oil Co. and Southern Minerals 1 M. G. Reed, 20 miles north of San Angelo, made two potential tests early this week. It was making considerable water, which was bled off from storage. The first 24-hour test gaged 192 bbl. of oil and 308 bbl. of salt water, from perforations at 6,180-90 ft., through various sizes of chokes. A second 24-hour flow, through 24/64-in. choke, from the section between 6,180-98 ft., produced 176 bbl. of 47°-gravity oil and 236 bbl. of salt water.

Flowing pressures on both tests ranged from 750-800 psi. on the casing, and 300 psi. on tubing, with gas-oil ratio being around 1,950 cu. ft. Operators were to erect a separator before making further tests. Arrow Drilling Co., contractor on the test, planned to skid the rig ¾ mile southwest for the 2 Reed, which will be 660 ft. from north and east lines of Section 1, Block 23, GC&SF Survey. This location was said to supersede first reports of the second test which placed it 660 ft. out of the southwest corner of Section 1, HE&WT Survey. Location of the 1 Reed is 1,980 ft. from south and west lines of Section 1, HE&WT Survey.

Discovery Ellenburger production was assured early this week at Humble Oil & Refining Co. 1-B I. L. Ellwood estate, 15½ miles north of Sterling City, in Sterling County, when the well was swabbed in to flow 56.7 bbl. of oil with no water, in 11½ hours. The flow was through ⅜-in. tubing choke, from casing perforations at 7,970-80 ft. Casing is set on the bottom at 8,000 ft. Flowing tubing pressure gaged 50 psi. Operators said some 40 ft. of pay was cased off in setting pipe to total depth to shut off sulfur water. Top of the Ellenburger was 7,958 ft., on an elevation of 2,356 ft. Location of the 1-B Ellwood, which is the first Ellenburger well in the county, is in the NE NW Section 56, Block 18, SPRR Survey, 1¾ miles south of the Mitchell County line and 8 miles west of the Coke line.

In southern Ector County, Amerada Petroleum Corp. 1 Hattie Connell, Section 2, Block 16, PSL Survey, extended Ellenburger production 1½ miles north, when it completed for a natural daily flowing potential of 328 bbl. of 44°-gravity oil, flowing through ½-in. tubing choke from open hole between 8,891-8,934 ft.

Midland County had further promises of a discovery well, in what is believed to be the Strawn sand, at Gulf Oil Corp. 1-E Bryant, Section 36, Block 39, T&P Survey, 14 miles southeast of Midland. A 4-hour drill-stem test from 9,324-9,410 ft. recovered 315 ft. of mud and 720 ft. of oil and gas-cut mud. Operators were to set the packer higher in the hole for another test.

**WEST TEXAS (DISTRICTS 8 & 7-C)**
**SUCCESSFUL WILDCAT**

Reeves County: C & B Oil Co. 1 Ollie P. Anderson, Sec. 18, Blk. 2, H&GN Sur., top pay 3,835 ft., shot sand 3,830-3,939 ft., flowed 73 bbl. 35°-grav. oil a day, 6/64-in. choke, TD 3,939 ft., PB 3,906 ft., Cosby-Bectel discovery.

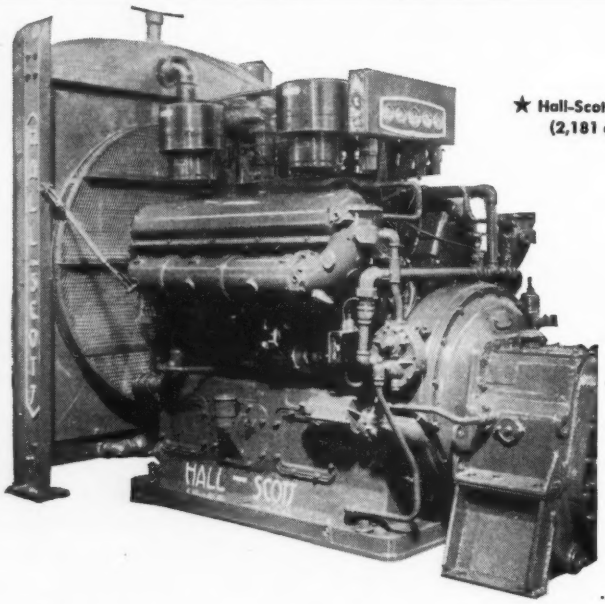
**WEST TEXAS (DISTRICTS 8 & 7-C)**
**WILDCAT FAILURES**

Martin County: Stanolind Oil & Gas Co. 1 J. E. Mabee, League 258, Briscoe CSL, 35 mi. NW Stanton, dry, TD 13,416 ft. dolomite, San Andres 4,280 ft., Wolfcamp 9,770 ft., Cisco 10,560 ft., Strawn 10,900 ft., Mississippi 11,280 ft., Fusselman 12,130 ft., Ellenburger 12,305 ft., Montoya 12,205 ft., Simpson 12,260 ft., elev. 2,889 ft.

Pecos County: Magnolia Petroleum Co. 1-31 H. J. Eaton, Sec. 31, Blk. 3, H&TC Sur., 8 mi. W Imperial, dry, TD 2,152 ft. in limestone.

Schermerhorn Oil Corp. 1 Leon Farms, Sec. 1, Blk OW, TCRR Sur., 8 mi. NW Fort Stockton, dry, TD 3,146 ft. in sand, lime 2,740 ft., Yates 2,967 ft., elev. 2,986 ft.

Reeves County: Jack Frost 1 Mrs. E. G.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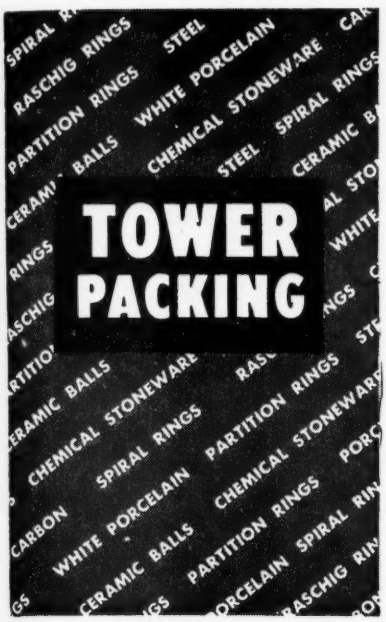


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Reynolds, Sec. 20, Blk. 50, T&P Sur., 13 mi. E Verhalen, dry, 5,185 ft., Delaware lime 5,129 ft., sand 5,160-80 ft., elev. 2,802 ft.

Runnels County: Southern Minerals Corp. 1 A. S. Dickinson, Chas. Osgood Sur. 364, ¼ mi. W Ballinger, dry, TD 4,491 ft., Palo Pinto 3,317 ft., Gardner sand 3,950 ft., Caddo 3,982 ft., Capps lime 3,594

(Continued on page 148)

## OHIO, KENTUCKY

### Producer May Lead Out From Hemlock Grove Pool

COLUMBUS.—Harry Kurchick et al completed a producer on Emmett Will, Section 6, Chester Township, Meigs County, that may be the lead out from Hemlock Grove pool that the operators have been looking for. The well is a ⅝-mile southwest extension to the pool. Berea sand came in at 1,715-31 ft. with 300 ft. of oil and 50.000 cu. ft. of natural. After a 40-qt. shot, 20 bbl. was swabbed in 24 hours.

Clayton pool was extended a little farther to the east by an outside offset, Quaker State Oil Co. 4 James Adrian, Section 11, Clayton Township, Perry County. Clinton sand was found at 3,320-80 ft. and showed an estimated 25 bbl. natural. The well is to be shot.

The new gas pool at Thompsonville in Monroe Township, Perry County, was extended ⅝ mile to the south by a small well, Ohio Fuel Gas Co. 1 T. F. Haughren, Section 12. Clinton sand was topped at 4,007 ft. and drilled to 4,046 ft. where the gage was 245,000 cu. ft. of natural, and 205,000 cu. ft. when shut in after shot.

E. P. Mellon Co. has staked a location for a wildcat test to the Oriskany sand on G. H. Hunt, Lot 33, in the northwest part of Washington Township, Tuscarawas County.

Athens County was first in new locations reported for the week with 5 out of a total of 28. Perry and Lorain counties followed with four each. Ashland field led in completions with 7 out of 22.

**OHIO SUCCESSFUL WILDCATS**

Medina Count, Litchfield Township: Ohio Fuel Gas Co. 1 A. M. McMichael, Lot 6, Clinton 2,662-67 ft., 504,000 cu. ft., TD 2,714 ft.

Morgan County, Penn Township: National Gas & Oil Corp. 1 J. C. O. Tompkins, Sec. 36, Medina 4,925-33 ft., 5 bbl., TD 4,934 ft.

**EASTERN KENTUCKY**

ASHLAND.—One of the largest completions in months was noted during the week, with Kentucky-West Virginia Gas Co. bringing in No. 5,803 on the William J. Damron property in Pike County.

The well was completed at 1,498 ft., total depth, and the flow was 5,607,000 cu. ft. of gas from the Maxon formation.

One other completion was noted during the week, the same company completing No. 5,793, also on the Damron property, Pike County, at a total depth of 1,785 ft. with 348,000 cu. ft. of gas flow in the Maxon.

**TENNESSEE WILDCAT FAILURE**
**(Previous completion)**

Giles County: California 1 Beeler, NE NE NE 4-D-38, dry, TD 5,750 ft., elev. 814 ft.

**WESTERN KENTUCKY**

OWENSBORO.—I. G. Watkins is drilling to set surface pipe at Pure Oil Co., Ashland Oil & Refining Co., and I. B. Browning 1 M. L. Walker, NE¼ 22-N-24, Webster County, the important 7,500-ft. deep test of the area southeast of Sebree.

J. C. Ellis and Producers Pipe Line 1 Vernon Erwin, 17-N-28, McLean County, will get a test of the Cypress at 2,021-25 ft. and a

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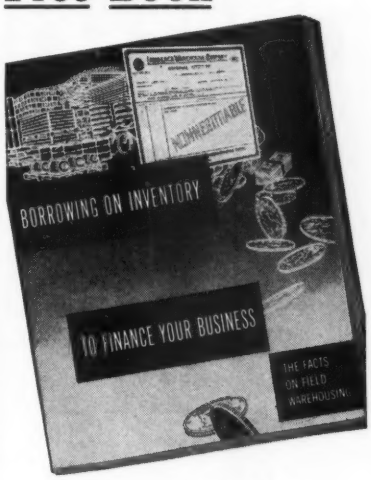


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probable further check of the small show of oil in the Tar Springs topped at 1,731 ft. The outpost is ¾ mile east of the Guffie pool.

Miller & Shiarella and Ashland Oil & Refining Co. 3 F. G. Robertson, 13-N-27, has been completed for an initial production of 150 bbl. per day from the Jackson sand at 1,934-69 ft. after a 150-qt. shot. Total depth is 2,029 ft.

**WESTERN KENTUCKY WILDCAT FAILURES**

Henderson County: Kingwood Oil Co. and W. Duncan 1 George Givens, 20-Q-24, dry, TD 1,673 ft.

Muhlenberg County: J. D. Hinton 1 Cecil Woods, 4-M-33, dry, TD 541 ft.

## INDIANA

EVANSVILLE.—Gibson County has prospects for a new oil area near the Indiana-Illinois line with production at Olen D. Sharp 1 Berry et al, NW SW NW 13-2s-13w. Operator is cleaning out to perforate casing opposite the Waltersburg at 1,898-1,955 ft. where side-wall cores got sand with good saturation. Well is located southeast and across the state line from the East Keensburg pool in Illinois.

In Vanderburgh County, south of Evansville, Joe Reznik 1 Bertram Edmond, NW SW SW 10-7s-11w, is testing the McClosky after a 2,000-gal. acid treatment. A drill-stem test of the pay recovered 420 ft. of oil in 1 hour and the well swabbed 3 bbl. of oil per hour natural. The McClosky limestone was found at 2,436-39 ft. and total depth is 2,439 ft.

Ashland Oil & Refining Co. and Kidd & Cherry are cleaning out to test the Cypress after setting casing at 1 Papenmeier, SE SW NW 4-6s-12w, northwest of Evansville. Recovery from a 2-hour drill-stem test at 2,397-2,401 ft. was 70 ft. of oil and 30 ft. of mud-cut oil with no water.

**INDIANA SUCCESSFUL WILDCAT**

Gibson County: George S. Engle 1 Oliver Batzell Heirs, SW SW NW 31-1s-11w, IP 25 bbl. of oil and 25 bbl. of water, McClosky, 2,299-2,304 ft., TD 2,304 ft.

**INDIANA WILDCAT FAILURES**

Vanderburgh County: National Associated Petroleum Co. 1 Willis Hilliard, NE SE NE 2-5s-10w, dry, TD 2,272 ft.

Ashland Oil & Refining Co. and H. E. Ledbetter, 1 George Thiel Estate, NE NE SW 36-4s-11w, dry, TD 2,558 ft.

Johnston Drilling Co. 1 Stanton Bryan, NW SW SE 5-7s-10w, dry, TD 2,580 ft.

Gibson County: Big 4 Oil & Gas Co. 1 Cora Wolfe, NW NE SE 4-1s-10w, dry, TD 1,958 ft.

Illinois Mid-Continent Co. 1 Olin McReynolds, NW NW SW 7-4s-11w, dry, TD 2,636 ft.


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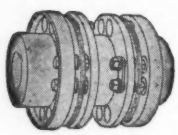

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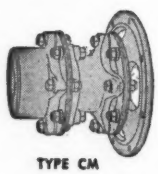
*Pipe Line Men* know that Thomas "Flexible" Couplings on their Low or High Speed Pumps give 100% dependable service.



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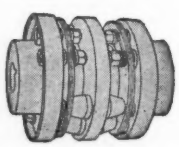

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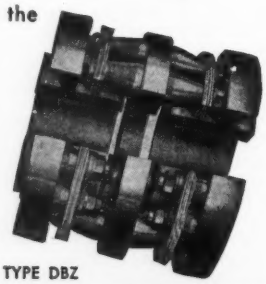
*In the Laboratory* Thomas "Flexible" Dynamometer Couplings assure the greatest accuracy.



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**THOMAS FLEXIBLE COUPLING CO.**
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# OKLAHOMA

## Okfuskee Wildcat Is Good Discovery Prospect

ONE of the best discovery prospects for the week is J. E. Crosby, Inc., and Warren Petroleum Corp. 1 Crain, SW SE NE 19-12n-7e, Okfuskee County. Casing was set on top of the Hunton at 4,308 ft. following good results for a drill-stem test taken at 4,311-30 ft. After a 500-gal. acid wash, the well flowed 690 bbl. in 21 hours, the first 9 hours through ¾-in. choke and the last 12 hours through ⅜-in. choke pinching the flow to 25 bbl. per hour.

In Pottawatomie County another wildcat is in the process of testing for completion in the Viola. J. C. Buel, Inc. 1 Blankston, CEL SE NW 12-6n-3e, has casing set at 4,250 ft., 12 ft. in the Viola, after a drill-stem test at 4,245-96 ft. recovered 285 ft. of oil. Standard tools have been moved in to drill the plug.

Pure Oil Co. 1 G. G. Derrick, NE NE NW 32-6n-11e, Hughes County, is drilling ahead following a good gas show on a drill-stem test of the Cromwell. The top of the Cromwell was called at 4,886 ft. and the test at 4,912-5,078 ft. had gas in 2½ minutes gaged for 3,590,000 cu. ft. per day.

A semiwildcat in the area between the Carr City and Mission fields of Seminole County is showing for a big producer. Davis & Stewart Drilling Co. 1 Pandley, SW NW SE 1-8n-5e, is reported to be swabbing at the rate of 40 bbl. per hour. Casing was set to 4,269 ft. and perforated with 75 holes opposite the Hunton at 4,019-55 ft. Well was treated with 4,000 gal. of acid and swabbed at the above rate. Total depth is 4,276 ft.

Superior Oil Co. of California has staked a Major County wildcat, 1 John F. Jantz, NE SW NE 20-22n-9w, in the eastern part of the county. The wildcat is about 3 miles north and 1 mile west of the Southeast Meno pool.

Continental Oil Co. et al 1 J. Maruska, SE SE SW 16-10n-4w, Cleveland County, is drilling ahead after recovery of 20 ft. of oil, 40 ft. of oil-cut mud, and 120 ft. of oil and gas-cut mud on drill-stem test of the Hunton at 8,157-8,239 ft. Top of the Hunton was 8,151 ft. and bit is now below 8,621 ft.

In Garvin County, L. C. Tharpe will probably run casing to test a Bromide show at 1 Moore, NW SE NW 32-4n-1w, northwest of Pauls Valley. A drill-stem test at 4,755-4,830 ft. with tool open for 30 minutes, recovered 270 ft. of gas-cut mud and 30 ft. of slightly oil-cut mud. Total depth is 5,201 ft.

**OKLAHOMA SUCCESSFUL WILDCATS**

Carter County: New pay, Sholem Alechem—Rocket 15 Jordan, SW NE NW 19-1s-3w, flowed 2,500,000 to 3,000,000 cu. ft. of gas (for lease use) from sands at 2,947-3,044 ft., TD 5,008 ft.

Cotton County: Norwood 1-B Moore, SE SW NE 6-5s-12w, pumped 16 bbl. of 42°-

gravity oil per day from sand at 1,549-65 ft., TD.

Kay County: Carter Oil Co. 1 School Land, SE SE SE 13-27n-1e, produced 8,516,000 cu. ft. of gas from Skinner at 3,494-3,502 ft., TD 4,153 ft.

Lincoln County: Anderson 1 Cunningham, NE SW NW 22-14n-4e, pumped 16 bbl. of 40°-gravity oil per day from Wilcox at 5,018-24 ft., TD.

Oklahoma County: Skelly 1 Adam, C SW SE 20-13n-2w, flowed 37 bbl. of distillate from Bois d'Arc (dual completion), TD 6,210 ft.

Pontotoc County: Jacques 1 Myers, SE SW SE 9-5n-6e, gaged 6,000,000 cu. ft. of gas from sand at 1,750-53 ft., TD 1,758 ft.

**OKLAHOMA WILDCAT FAILURES**

Comanche County: Fisher 1 Fullbright, SW SW NW 9-3n-11w, dry, TD 2,504 ft., sand 344-60 ft., granite wash 690 ft.

Fisher 2 Fullbright, SW SW NW 9-3n-11w, dry, TD 392 ft., no tops reported.

Garvin County: Hines 1 Readmour, SE NE SE 10-2n-2e, dry, TD 2,888 ft., broken sand 1,700-1,975 ft., McLish 1,975-2,000 ft., broken sand 2,100-2,270 ft., Oil Creek 2,270-75 ft., 2,400-25 ft., 2,445-55 ft. and 2,470-90 ft., Arbuckle 2,800 ft., slight stains of oil in all samples.

Le Flore County: Le Flore 1 Pate, C NW NW 23-6n-25e, dry, TD 2,200 ft., Hartshorn coal 1,891 ft., broken sand 1,893 ft., sandy shale 1,945 ft., coal 1,988 ft., sandy shale 2,008-80 ft., broken sand 2,080-97 ft.

(Continued on page 147)

# CALIFORNIA

## Kern County Wildcat Proves Noncommercial

LOS ANGELES.—Hopes for an important discovery at the Independent Exploration Co. 3 Swan, 15-28s-28e, in the Harktooth area of Kern County, faded last week as the company announced it was preparing to abandon an offset test to the prospective discovery well. The 3 Swan has been bailing oil and sand in apparently commercial quantities for several days from a total depth of 2,764 ft., and general opinion has been that a nice field had been found. However, interest in the area declined rapidly during the past week when the 4 Swan encountered only 11 ft. of oil sand and 2 ft. of gray sand. The oil sand in this test might have been sufficient to make a marginal well, but operators said that no shale break was found between the oil and water sands and that it would be impossible to produce the well. Failure of the venture will probably nullify the drilling of four more locations that were expected to be productive.

Chanslor-Canfield-Midway Oil Co. finally is starting a follow-up venture to test a new shallow zone which it uncovered somewhat by accident in the Padre Canyon field of Ventura County a few months ago. After remaining untouched for many years, the new zone at 3,200 ft. was discovered in routine testing of the B-50 Hobson, 16-3n-24w, which subsequently was completed as a 250-bbl. well. The new zone lies above the so-called "Top Zone," which is the shallowest producing zone in the field, and undoubtedly has been penetrated many times during the course of development at Padre Canyon. After completion of the B-50 Hobson, C. C. M. O. continued development of the deeper zones at Padre Canyon and now apparently has decided to come back and try another venture in the new zone. This test will be known as the B-51 Hobson, and it will be located in the same section as the discovery.

Independent Exploration Co. and Superior Oil Co. have announced location for a new exploratory venture in the Blackwell's Corner area of Kern County, the 1 O.C.L., 31-26s-18e. Announcement of this location is the beginning of the largest campaign in Independent's history. The campaign involves 16,000 acres of land held jointly by Independent and Superior and supposedly containing several extremely good prospects. Several test wells probably will be drilling in order to obtain data on the entire area.

**CALIFORNIA SUCCESSFUL WILDCAT**

Kern County, McDonald Anticline area: Independent Exploration Co. 2 Layman, 18-28s-20e, pumped 25 bbl. daily, perf. 1,372-1,404 ft., TD 1,638 ft.

**CALIFORNIA WILDCAT FAILURES**

Glenn County, Afton area: Richfield Oil Corp. 2 Afton Comm., 27-19s-1w, dry, TD 2,850 ft.

Kern County, San Emigdio area: Continental Oil Co. L-2 K.C.L., 8-11n-21w, dry, TD 13,175 ft.

Semitropic area: Standard Oil Co. 32 Towle Estate 4, 7-27s-23e, dry, TD 2,634 ft.

San Joaquin County, Stockton area: Amerada Petroleum Corp. 25-2 Martenet, 2-2n-8e, dry, TD 4,319 ft.

Tulare County, Visalia area: W. J. Carter 1 Carter-Chedester, 21-18s-25e, dry in granite, TD 1,677 ft.

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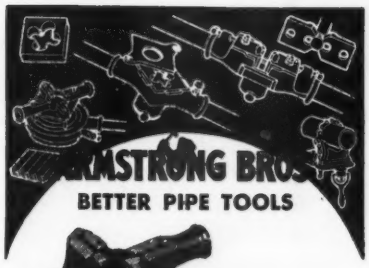

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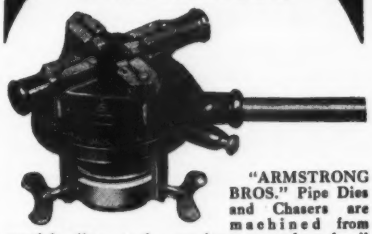

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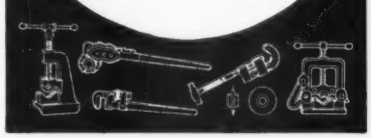

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# STATISTICS and

## WEEKLY WELL COMPLETIONS . . . WEEK ENDED MAY 29, 1948

| | Total of all wells | | | | | Cum. | | Wildcat completions and discoveries | | | | | Cumulative total, 1948 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Comp. | Oil | Gas | Dry | Footage | 1948 | 1947 | Oil | Dist. | Gas | Dry | Total | Oil | Dist. | Gas | Dry | Total |
| New York | 27 | 14 | 0 | *13 | 31,306 | 652 | 502 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pennsylvania | 46 | 19 | 7 | †20 | 111,547 | 1,122 | 1,233 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 13 | 22 |
| West Virginia | 17 | 1 | 12 | ‡4 | 38,869 | 308 | 312 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 20 | 28 | 51 |
| Ohio | 22 | 10 | 5 | 7 | 54,197 | 526 | 508 | 1 | 0 | 1 | 0 | 2 | 2 | 0 | 8 | 14 | 24 |
| Indiana | 18 | 10 | 0 | 8 | 35,894 | 374 | 229 | 1 | 0 | 0 | 5 | 6 | 6 | 0 | 1 | 16 | 23 |
| Kentucky | 10 | 2 | 2 | 6 | 16,333 | 256 | 226 | 0 | 0 | 0 | 2 | 2 | 3 | 0 | 0 | 8 | 11 |
| Illinois | 56 | 32 | 0 | ‡24 | 148,585 | 818 | 750 | 1 | 0 | 0 | 4 | 5 | 17 | 0 | 1 | 128 | 146 |
| Michigan | 23 | 5 | 3 | 15 | 51,404 | 268 | 278 | 0 | 0 | 0 | 8 | 8 | 8 | 0 | 6 | 105 | 119 |
| Kansas | 61 | 32 | 8 | 21 | 200,712 | 1,141 | 1,015 | 2 | 0 | 0 | 10 | 12 | 21 | 0 | 2 | 150 | 173 |
| Neb., Mo., Iowa | 1 | 1 | 0 | 0 | 2,450 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oklahoma | 68 | 33 | 6 | 29 | 237,713 | 1,583 | 1,606 | 2 | 1 | 3 | 13 | 19 | 52 | 6 | 12 | 258 | 328 |
| Texas | 221 | 127 | 7 | 87 | 919,659 | 4,505 | 3,436 | 6 | 1 | 0 | 44 | 51 | 127 | 12 | 42 | 794 | 975 |
| North Central (Dist. 7-B & 9) | 80 | 35 | 0 | ‡45 | 228,545 | 1,395 | 1,059 | 2 | 0 | 0 | 22 | 24 | 50 | 0 | 6 | 272 | 328 |
| West (Dist. 7-C & 8) | 54 | 45 | 0 | 9 | 219,567 | 1,202 | 820 | 1 | 0 | 0 | 5 | 6 | 19 | 0 | 2 | 85 | 106 |
| Panhandle (Dist. 10) | 9 | 6 | 1 | §2 | 26,788 | 240 | 174 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 7 |
| Eastern (Dist. 5 & 6) | 5 | 4 | 0 | 1 | 26,287 | 207 | 201 | 1 | 0 | 0 | 1 | 2 | 5 | 1 | 0 | 51 | 57 |
| Gulf Coast (Dist. 2 & 3) | 38 | 20 | 3 | 15 | 244,799 | 723 | 642 | 2 | 0 | 0 | 9 | 11 | 32 | 9 | 9 | 179 | 229 |
| Southwest (Dist. 1 & 4) | 35 | 17 | 3 | 15 | 173,673 | 738 | 540 | 0 | 1 | 0 | 7 | 8 | 21 | 2 | 24 | 201 | 248 |
| Louisiana | 52 | 32 | 2 | 18 | 183,401 | 835 | 496 | 0 | 0 | 0 | 6 | 6 | 14 | 8 | 2 | 80 | 104 |
| Northern | 40 | 25 | 2 | 13 | 101,535 | 559 | 251 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 40 | 40 |
| Southern | 12 | 7 | 0 | 5 | 81,866 | 276 | 245 | 0 | 0 | 0 | 2 | 2 | 14 | 8 | 2 | 40 | 64 |
| Arkansas | 8 | 4 | 0 | 4 | 27,385 | 126 | 103 | 0 | 0 | 0 | 2 | 2 | 3 | 0 | 0 | 34 | 37 |
| Mississippi | 8 | 6 | 0 | 2 | 53,206 | 159 | 163 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 3 | 35 | 40 |
| Southeastern States (Misc.) | 1 | 0 | 0 | 1 | 5,750 | 18 | 18 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 16 | 16 |
| Montana | 7 | 5 | 1 | 1 | 16,894 | 103 | 74 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 7 | 8 |
| Wyoming | 12 | 4 | 0 | 8 | 51,837 | 167 | 89 | 0 | 0 | 0 | 2 | 2 | 12 | 0 | 0 | 19 | 31 |
| Colorado-Utah | 6 | 6 | 0 | 0 | 38,555 | 101 | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 17 |
| New Mexico | 11 | 9 | 1 | 1 | 48,876 | 256 | 205 | 0 | 0 | 0 | 1 | 1 | 4 | 1 | 0 | 17 | 22 |
| California | 63 | 53 | 0 | 10 | 215,936 | 1,166 | 809 | 1 | 0 | 0 | 5 | 6 | 29 | 0 | 0 | 116 | 145 |
| Total United States | 738 | 405 | 54 | 279 | 2,490,509 | 14,485 | 12,123 | 14 | 2 | 4 | 105 | 125 | 304 | 27 | 106 | 1,855 | 2,292 |
| Total previous week | 763 | 451 | 54 | 258 | 2,688,256 | 13,747 | 11,631 | 19 | 2 | 1 | 82 | 104 | 290 | 25 | 102 | 1,750 | 2,167 |
| Total May 31, 1947 | 492 | 274 | 55 | 163 | 1,797,222 | | | 11 | 2 | 2 | 64 | 79 | 259 | 34 | 69 | 1,470 | 1,832 |

Service wells included: *13, †19, ‡1, §2.

## CRUDE PRICES AND REFINERY ACTIVITY

### GRAVITY SCHEDULES

**Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:**

| Gravity— | Signal Hill, Calif. | Oklahoma, Kansas | Gulf Coast Tex.* | West Tex.† |
|---|---|---|---|---|
| 18-18.9 | $2.17 | .... | .... | .... |
| 19-19.9 | 2.19 | .... | .... | .... |
| 20-20.9 | 2.21 | $2.25 | .... | $2.12 |
| 21-21.9 | 2.23 | 2.27 | .... | 2.14 |
| 22-22.9 | 2.27 | 2.29 | .... | 2.16 |
| 23-23.9 | 2.30 | 2.31 | .... | 2.18 |
| 24-24.9 | 2.34 | 2.33 | $2.56 | 2.20 |
| 25-25.9 | 2.38 | 2.35 | 2.58 | 2.22 |
| 26-26.9 | 2.41 | 2.37 | 2.60 | 2.24 |
| 27-27.9 | 2.45 | 2.39 | 2.62 | 2.26 |
| 28-28.9 | 2.49 | 2.41 | 2.64 | 2.28 |
| 29-29.9 | 2.52 | 2.43 | 2.66 | 2.30 |
| 30-30.9 | 2.56 | 2.45 | 2.68 | 2.32 |
| 31-31.9 | 2.59 | 2.47 | 2.70 | 2.34 |
| 32-32.9 | 2.62 | 2.49 | 2.72 | 2.36 |
| 33-33.9 | .... | 2.51 | 2.74 | 2.38 |
| 34-34.9 | .... | 2.53 | 2.76 | 2.40 |
| 35-35.9 | .... | 2.55 | 2.78 | 2.42 |
| 36-36.9 | .... | 2.57 | 2.80 | 2.44 |
| 37-37.9 | .... | 2.59 | 2.82 | 2.46 |
| 38-38.9 | .... | 2.61 | 2.84 | 2.48 |
| 39-39.9 | .... | 2.63 | 2.86 | 2.50 |
| 40 and above | .... | 2.65 | 2.88 | 2.52 |

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico.

### A.P.I. REFINERY REPORT, WEEK ENDED MAY 22

(Thousands of barrels)

| District— | Crude runs, daily avg. | Production: Gasoline† | Production: Kerosine | Production: Gas & dist. oil | Production: Residual | Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline* | Stocks: Kerosine | Stocks: Gas & dist. oil | Stocks: Residual |
|---|---|---|---|---|---|---|---|---|---|
| East Coast | 896 | 2,057 | 367 | 926 | 1,772 | 25,157 | 6,211 | 9,854 | 9,282 |
| Appalachian: | | | | | | | | | |
| District 1 | 96 | 282 | 52 | 77 | 83 | 2,064 | 301 | 436 | 317 |
| District 2 | 72 | 281 | 23 | 48 | 114 | 1,143 | 122 | 177 | 185 |
| Ind., Ill., Ky. | 916 | 3,168 | 379 | 931 | 1,130 | 21,472 | 2,444 | 4,464 | 3,975 |
| Okla., Kans., Mo. | 448 | 1,515 | 177 | 542 | 544 | 9,047 | 893 | 2,378 | 1,721 |
| Inland Texas | 231 | 986 | 75 | 169 | 405 | 3,512 | 587 | 419 | 906 |
| Texas Gulf Coast | 1,370 | 4,452 | 604 | 2,197 | 1,923 | 17,590 | 1,618 | 5,566 | 5,138 |
| La. Gulf Coast | 449 | 1,335 | 330 | 857 | 551 | 4,903 | 1,138 | 2,370 | 1,543 |
| N. La. and Ark. | 63 | 179 | 48 | 56 | 85 | 1,561 | 468 | 430 | 136 |
| Rocky Mountain: | | | | | | | | | |
| New Mexico | 13 | 43 | 7 | 12 | 26 | 109 | 25 | 29 | 30 |
| Other Rocky Mt. | 153 | 509 | 32 | 185 | 230 | 3,163 | 116 | 691 | 975 |
| California | 880 | 2,441 | 35 | 1,106 | 2,421 | 17,213 | 962 | 10,519 | 30,244 |
| May 22, 1948 | 5,587 | 17,248 | 2,129 | 7,106 | 9,284 | 106,934 | 14,885 | 37,333 | 54,452 |
| May 15, 1948 | 5,640 | 17,141 | 2,253 | 6,800 | 9,002 | 108,385 | 14,065 | 36,267 | 52,930 |
| May 24, 1947 | 5,015 | 15,227 | 2,089 | 5,611 | 8,345 | 97,062 | 11,422 | 33,481 | 44,652 |

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 221,722,000 bbl. as of May 22—down 50,000 bbl. One year ago 237,702,000 bbl.

### FLAT CRUDE PRICES

| Representative posted schedules per bbl. | |
|---|---|
| East Texas | $2.65 |
| Kettleman Hills, California* | 2.14 |
| Beauregard Parish | 2.60 |
| Illinois Basin | 2.77 |
| Pecos County, Texas (Yates) | 2.35 |
| Bradford, Pennsylvania | 5.00 |
| Eastern Ill. and Western Ind.† | 2.77 |
| Tomball, Texas Gulf Coast | 2.83 |

*37°-37.9°. †35° and above.

# TRENDS

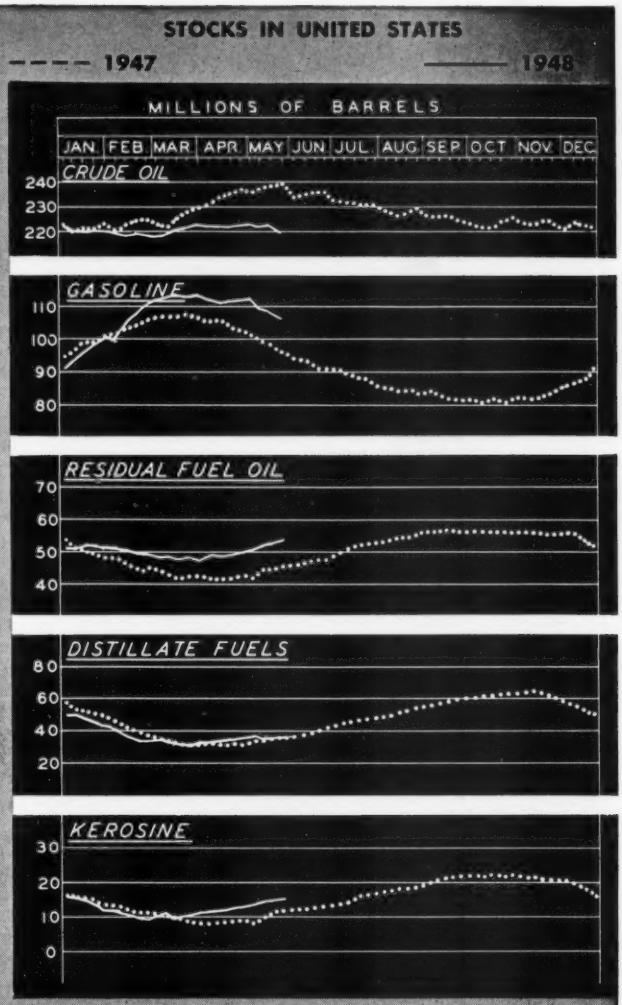
## DAILY AVERAGE PRODUCTION FOR WEEK

| | May 29 crude oil | B. of M. May demand | May 22 crude oil |
|---|---|---|---|
| Alabama | 1,350 | 1,500 | 1,550 |
| Arkansas | 82,150 | 85,000 | ‡82,920 |
| California | 947,500 | 940,000 | 947,300 |
| Colorado | 43,400 | 48,000 | 45,490 |
| Eastern | 67,200 | 64,900 | 68,450 |
| Florida | 700 | 1,000 | 700 |
| Illinois | 173,700 | 178,000 | 170,500 |
| Indiana | 20,500 | 16,000 | 19,700 |
| Kansas | 303,900 | 300,000 | 305,100 |
| Kentucky | 25,500 | 26,000 | 25,600 |
| Louisiana | 465,825 | 477,000 | 466,275 |
| North Louisiana | 111,150 | ..... | 111,600 |
| South Louisiana | 354,675 | ..... | 354,675 |
| Michigan | 46,200 | 46,000 | 44,600 |
| Mississippi | 122,015 | 119,000 | 118,815 |
| Montana | 23,630 | 25,000 | 23,580 |
| Nebraska | 450 | 600 | 450 |
| New Mexico | 126,000 | 133,000 | 126,000 |
| Oklahoma | 423,050 | 420,000 | 416,600 |
| Texas | 2,419,325 | 2,450,000 | 2,419,325 |
| Dist. 1 (Southwest) | 26,850 | ..... | 26,850 |
| Dist. 2 (Southwest) | 171,950 | ..... | 171,950 |
| Dist. 4 (Southwest) | 255,650 | ..... | 255,650 |
| Dist. 3 (Gulf Coast) | 492,850 | ..... | 492,850 |
| Dist. 5 (Eastern) | 46,325 | ..... | 46,325 |
| Dist. 6 (Eastern) | 121,900 | ..... | 121,900 |
| East Texas Field | 303,000 | ..... | 303,000 |
| Dist. 7-C (West) | 44,975 | ..... | 44,975 |
| Dist. 8 (West) | 687,875 | ..... | 687,875 |
| Dist. 7-B (W. Central) | 45,000 | ..... | 45,000 |
| Dist. 9 (N. Central) | 138,450 | ..... | 138,450 |
| Dist. 10 (Panhandle) | 84,500 | ..... | 84,500 |
| Wyoming | 147,830 | 152,000 | 147,690 |
| Total United States | *5,440,225 | 5,483,000 | ‡5,430,645 |
| Change from prev. wk., up | 9,580 | | |

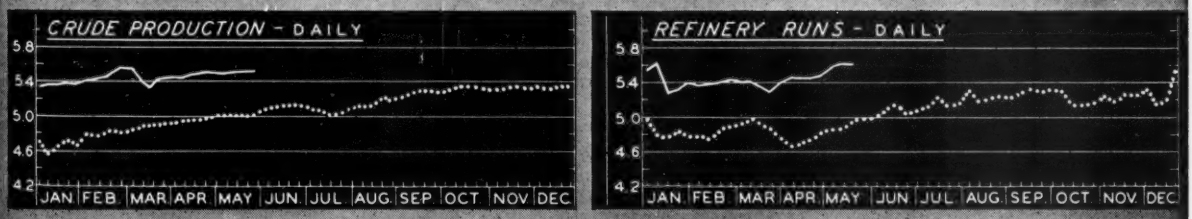
Total production January 1-May 29 ..... †815,528,320 bbl.
Same period last year (crude plus cond.).. 725,753,680 bbl.

*Not incl. 78,930 bbl. condensate; †Incl. ‡11,085,280 bbl. condensate. ‡Revised.

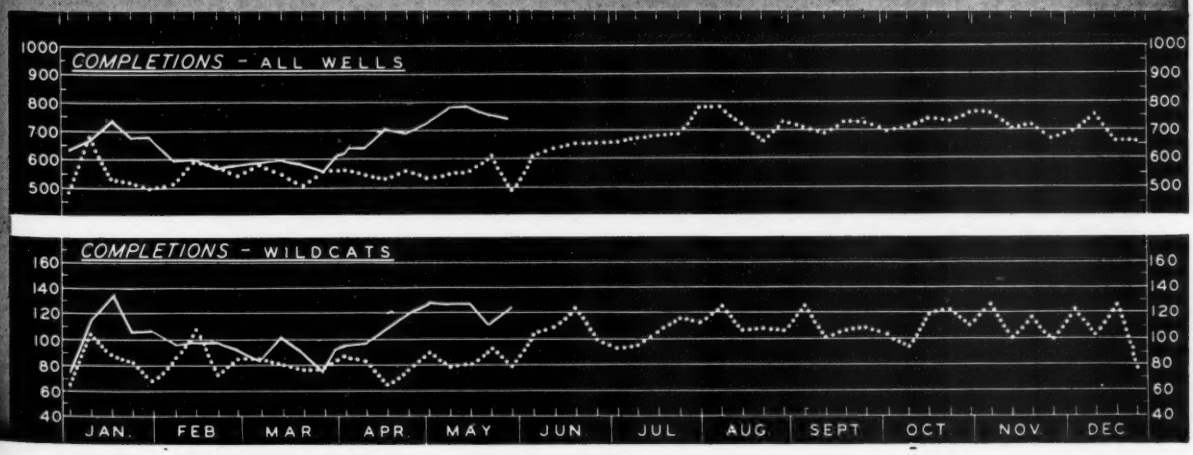
## STOCKS IN UNITED STATES




## DAILY OPERATIONS




## WEEKLY COMPLETIONS



PENBERTHY
AUTOMATIC
INJECTORS

The accepted method for assuring an uninterrupted supply of feed water to oil field boilers. Penberthy Automatic Injectors will supply feed water to boilers at minimum cost, are quickly and easily installed, reliable under most severe operating conditions, require little attention and no careful handling. Highest quality design and rugged construction.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

LOOK

FOR THIS CAN ON YOUR SUPPLY STORE SHELF

Use it on every threaded connection and you'll never be troubled with leaking connections. Over a million pounds used by the Industry in nine years.

*Manufactured in Houston, Texas, by*
RECTOR WELL EQUIPMENT CO., Inc.
Gen'l. Offices: Fort Worth, Texas

RECTORSEAL
THE POSITIVE LEAK PREVENTER

# MARKETS

IN the Texas Gulf Coast area the spot-market supplies of all petroleum products except some shipments of No. 6 fuel oil were reported scarce. What little motor fuel was available was moving on the open market at a high of 12¾ cents per gallon, and about ¼ cent higher for water shipment.

### No. 2 Is Tight

No. 2 and kerosine were also tight with much of these products going to storage in their normally slack season. Tank-car market in No. 6 was reported sloppy, though demand for this material for shipment by water was still strong. Prices for No. 6 were reported ranging up to $2.65 per barrel.

In the New York Harbor area last week suppliers reported some increase in inquiries for domestic fuel oil for stockpiling purposes. However, most suppliers continued to sell to old customers and on an allocation basis. Small lots were said to have been available at prices ranging from 10.75 cents to 11 cents per gallon, but no sales at these prices were confirmed.

Along the Eastern Seaboard prices remained generally unchanged.

In the Mid-Continent area strong demand for gasoline continued, but few spot sales were reported. Shipments of spot material in Oklahoma were particularly scarce. A few shipments, though unconfirmed, were said to have been sold at 12¾ cents.

One Oklahoma dealer bought three cars of housebrand at 12½ cents per gallon, Ranger (Texas) Group, buyer's cars. A purchase of one car of housebrand gasoline, Group 3, was reported sold for 12⅞ cents, for Kansas City delivery. One shipper reported being offered 20,000 bbl. of housebrand gasoline for delivery in June at 13¼ cents and premium gasoline at 14 cents.

Opinion varied as to the outlook of the price level for gasoline in the next few weeks. One observer reported that he thought little if any increase would be seen even throughout the peak of the summer demand season. Motoring consumption, he said, may not be nearly as high as some have predicted. Another source indicated that demand will increase strongly and that premiums paid for spot-market material will continue up "at least a little higher."

Burning oils continued firm in the Mid-Continent area and nearly all movements were reported at around 9¼ to 9½ cents per gallon for good material. One buyer said that the best offer he found last week for No. 2 was at 9½ cents and that in buyer's cars. He said he did not expect to see any price decline for this product and that an early heavy demand would be likely. A few East Texas offers, not confirmed, were reported at 9¼ cents.

### Demand for No. 6 Slow

Demand for No. 6 continued slow and one buyer reported that his lowest offers for this product were at $2.50 and $2.55 for low-sulfur material. High sulfur material he said was moving as low as $2.35.

"Clean" tank cars were reported by most suppliers as not much of a problem to obtain, although they still remained in shorter supply than "dirty" cars. According to the American Railway Car Institute, delivery of tank cars during the first 4 months of this year was nearly 2½ times the production rate of a year ago. The total through April was 2,084, as compared with 852 during the like period in 1947.

## Representative Quotations

Representative spot-market quotations of leading suppliers as of May 31, 1948. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

**GASOLINE, KEROSINE, AND FUEL OILS**

| | Mid-Continent Group 3 | New York Harbor | Texas Gulf Coast |
|---|---|---|---|
| Regular gasoline, 73-75 octane | 10½-12 | 11.6-12* 10.5-12.2† | 10.9-12¾ |
| Premium gasoline, 78-80 octane | 11½-13 | 10.6-13.4 | 12.9-13½ |
| 42-44 w.w. kerosine | 9½-10 | 10.3-12 | 10¼ |
| No. 2 straw fuel oil | 9¼- 9¾ | 9.4-10 | 9.05- 9¾ |
| No. 6 residual | $2.50-2.65 | $3.03-3.90 | $2.56-3.00 |

*Branded (74-76 octane); †Unbranded (74-76 octane).

**NATURAL GASOLINE**

| | Group 3 | North Texas | N. La. |
|---|---|---|---|
| Grade 26-70 | 8½ | 8 | 8¼ |
| Grade 18-55 | 10.2 | 9.6 | 9.9 |

**LUBRICATING OILS**

South Texas

| | |
|---|---|
| 200 vis., No. 2-3 neutral | 13-14.5 |
| 750 vis., No. 3-4 neutral | 15-17.25 |
| 2,000 No. 5-6 neutral | 17-18½ |

**LUBRICATING OILS**

Mid-Continent

| | |
|---|---|
| 150-160 vis., D bright stock, 0-10 pp. | 30-33 |
| 200 vis. No. 3 neutral, 0-10 pp. | 30-31 |

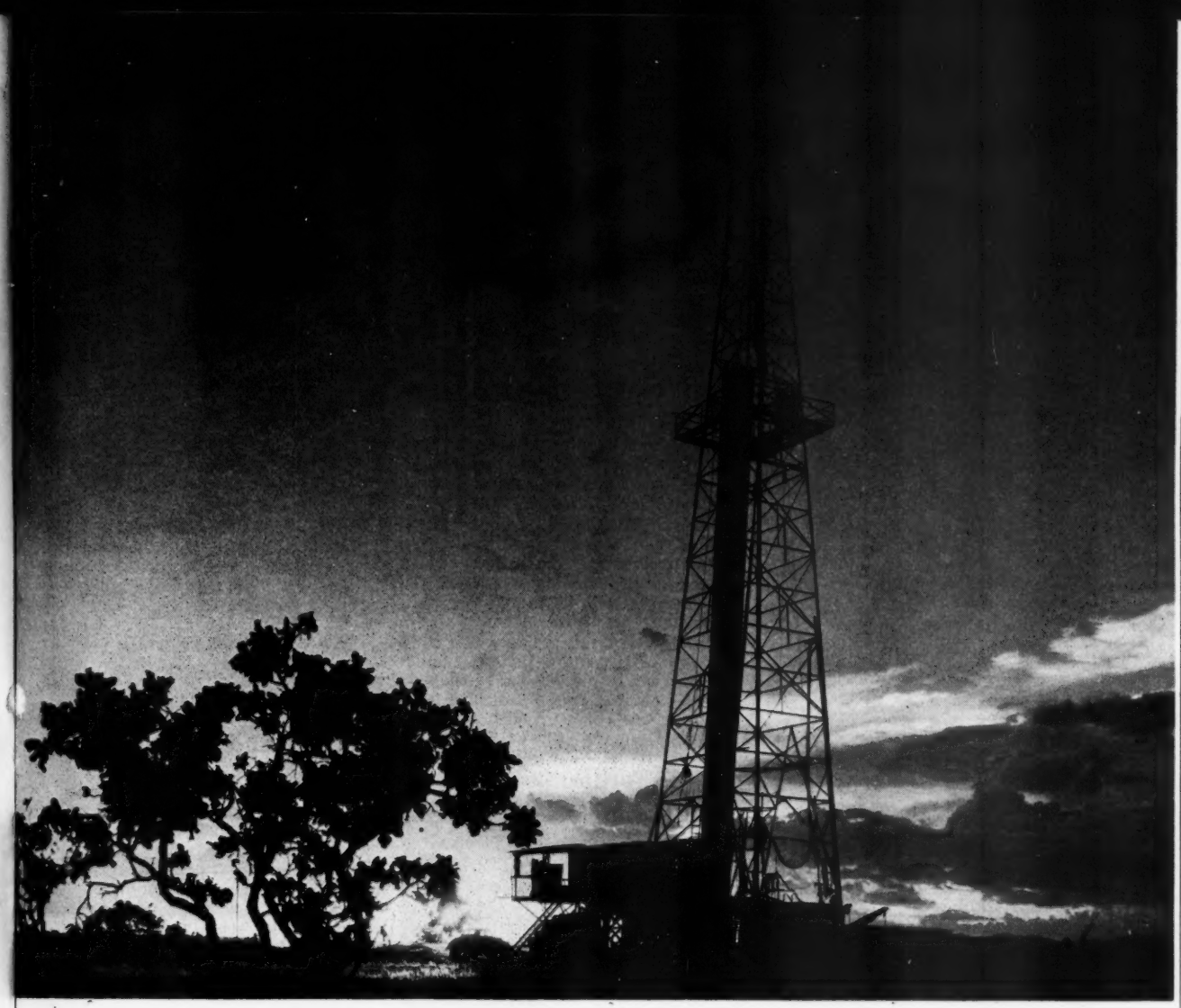
Western Pennsylvania

| | |
|---|---|
| 145-155 vis. 10 p.t. bright stock | 47 |
| 180 vis. p.t. neutral | 48 |

**CRUDE-SCALE WAX**

Mid-Continent

| | |
|---|---|
| 130-132 A.S.T.M. melting point | 7-7½ |



A DRILLING WELL SILHOUETTED AGAINST A TYPICAL EASTERN VENEZUELA SKY

SCHLUMBERGER is an "old hand" in Venezuela, having enjoyed close fellowship with Venezuelan oil operators since 1929. As a result of the unselfish cooperation and encouragement of these men, Schlumberger has developed a substantial service organization in Venezuela and has always made available to them the most modern techniques. In fact, the Dipmeter—now a widely used Schlumberger service—first won unreserved recognition there.

Realizing its responsibility to the industry, Schlumberger has spared no effort to improve constantly its service facilities in Venezuela. With 3 camps, a total of 8 operating centers, 14 skid winches and 31 service trucks already established in Venezuela, Schlumberger invested an additional one million three hundred thousand dollars in 1947 to improve further its service there.

SCHLUMBERGER SURENCO
Caracas, Venezuela
Apartado 1608
*Cable:* Surenco
*Serving:* Venezuela, Trinidad, Ecuador, Brazil and Mexico

# EQUIPMENT MEN ... in the News

## Management Changes in Continental Supply

D. D. DELLINGER

F. M. Mayer, president of Continental Supply Co., Dallas, has announced the promotion of three executives to new positions. The changes became effective June 1.

D. D. Dellinger, treasurer of the company since 1940, has been elected vice president in charge of finance. He will continue serving as treasurer.

N. A. ENDICOTT

J. A. MUSSLER

Noble A. Endicott, for the past 6 years sales manager, has been elected vice president in charge of Gulf Coast operations, with headquarters in Houston.

Jack A. Mussler, since 1939 manager of tubular division, has been appointed general manager of sales, a newly created position.

Dellinger joined Continental in 1933. Prior to that time he was engaged in a family business in Ohio. After becoming associated with Continental, he served in the capacity of assistant treasurer until his elevation to treasurer in 1940.

Endicott entered the services of Continental in 1916. In 1919 he went to Ranger as a field man, and in January 1936 was transferred to the general offices in Dallas. He was for a time in charge of the company's Canadian operation. After entering the Dallas office, he was appointed assistant manager of sales, becoming sales manager in 1942.

Mussler became associated with Continental in 1935 as district manager of tubular sales, Houston. He was previously connected with Youngstown Sheet & Tube Co., having joined that organization in 1923. In 1929 he went to Europe and the Middle and Far East in the interests of Youngstown Sheet & Tube Co. In 1932 he was transferred to Houston and in 1935 he joined Continental as district manager of tubular sales.

## Hawthorne Opens New Offices

Herb J. Hawthorne, Inc., Houston, makers of Hawthorne replaceable blade bits and "rock cutter" blades announces the opening of new offices and warehouse at 2001 Harold Street, Houston.

Hawthorne replaceable-blade bits are produced at the factory, which remains at its present location, 5003 North Shepherd Drive, Houston.

## Republic Supply Names Turner

J. W. TURNER

Republic Supply Co., Houston, announces the appointment of J. W. Turner as credit manager. Turner has moved to Houston headquarters from Corpus Christi where he was associated with the Sam E. Wilson Interests in an official capacity. Turner is a graduate of Oklahoma A. & M., and has spent all of his business career in the oil industry. At one time he was connected with Lucey Products Co., Tulsa, in the treasury department and served several years in the credit department of Oil Well Supply Co. at Dallas.

H. A. McDannald, in the credit department of Republic Supply Co. for some time, will assist Turner as assistant credit manager.

## Goodrich Veteran Completes 40 Years of Service

L. L. Smith, treasurer of The B. F. Goodrich Co., completed 40 years of service with his company on April 6.

"Lou" Smith joined Goodrich as a tire adjuster immediately after his graduation from school in 1908.

In 1918 he became a general credit manager and in 1920 was named assist treasurer. In December 1940 he was elected to his present position as treasurer of the company.

## West Coast Office Change for Marley

Marley Co., Inc., announces the change of its Los Angeles office address to 810 South Spring Street. Harold A. Dresser recently joined the Los Angeles sales department, taking over his duties after a 2-month intensive training period in the Marley home office in Kansas City.

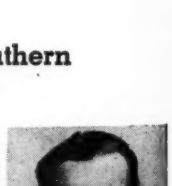
Dresser, who has been asociated with cooling-tower manufacturers for 22 years, is a native Californian and resides with his family in Lynwood. He is an alumnus of California Institute of Technology and a member of the California Natural Gasoline Association.

## Coslow and Mautner Elected Directors

C. W. Coslow, vice president in charge of manufacturing of the Los Angeles plant, and M. M. Mautner, vice president and secretary, were elected directors of Plomb Tool Co. at the annual meeting of the stockholders, held recently in Los Angeles.

Coslow represents the entire manufacturing personnel of the Los Angeles plant and serves on the company's management committee. Mautner is in charge of the industrial relations department, is secretary of the company and serves on the management and sales management committees.

## Fetzer Joins Southern Geophysical



E. L. FETZER

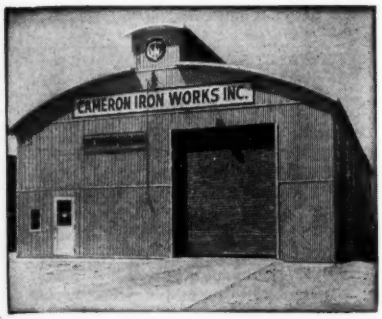
Edwin L. Fetzer has joined the staff of Southern Geophysical Co., Fort Worth, with offices in the Sinclair Building.

Fetzer is a graduate of Texas A. & M. College, class of 1933, with a geology major and has been with National Geophysical Co. in Dallas the past 11 years. During World War II he served from 1942 until 1944 and attained the rank of captain during the African campaigns.

Fetzer will supervise the work of several seismograph crews of Southern Geophysical Co. in West Texas.

## Cameron Iron Celebration At Odessa

A new Cameron Iron Works store recently was opened at Odessa, Tex., and the West Texas division manager,




*New Cameron warehouse at Odessa*

Roy Davis, was host to approximately 750 oil and supply men from the surrounding county. Barbecue and refreshments were served by the Odessa Chuck Wagon Gang.

Cameron officials and employes who attended the celebration were E. L. Lorehn, vice president and general manager; Ralph McCullough, secretary-treasurer; Bob Farmer, assistant sales manager; J. M. (Red) Teague, service manager; Homer Brown and Gene Teer from Houston; Merle Hooks from Hobbs, N. M. Pud O'Connor, Jake Dyer, and Bubba Barr from Odessa assisted Roy Davis with the entertainment.

## Dempsey Forms New Corporation

A formation of a new corporation in Tulsa for the manufacture of three new products to aid oil production has been announced by Oscar E. Dempsey, pioneer pipe-line contractor and president of the new firm.

The new bottom-hole pump designed by Dempsey incorporates the same principle which he used in designing an underground road-crossing punch used successfully for several years. The pump unit can be actuated either by oil, gas, or water and is designed to meet any operating field conditions. According to Dempsey, field tests have proved it to be economical, simple, and efficient.

Incorporating the same principle as the bottom-hole pump, the new firm is also manufacturing a device it calls the Rotoram. This Rotoram is used in rotary drilling and, as the word implies, the valve, actuated by drilling-mud pressure, creates a blow of approximately 50,000 lb. into the rock formation breaking the formation ahead of the rock bit.

Charles L. English, vice president of the new Dempsey Pump Co., has designed a new rotary high-pressure pumping unit capable of displacing large volumes of crude oil and salt-water disposals at very high pressure.

The new firm has purchased the large factory building at 2440 East King Street in Tulsa, where it will manufacture the new pumps and the Rotoram. Specialty Sales & Service, Inc., of Tulsa will distribute the Dempsey pumps.

## Coyle Recipient of Parlin Award

M. E. Coyle, executive vice president of General Motors, will receive the 1948 Parlin Memorial Award, it is announced by the Philadelphia chapter of the American Marketing Association.

The award will be conferred on Coyle for his contribution to the science of marketing. It will be presented formally at a dinner in Philadelphia May 18, at which time Coyle will deliver the 1948 Parlin Memorial lecture on the subject "The Manufacturer's Responsibility in Distribution."

The Parlin Memorial Award and lecture are sponsored annually by the Philadelphia chapter of the American Marketing Association, in cooperation with Curtis Publishing Co. The occasion honors the late Charles Coolidge Parlin, pioneer in market research.

## Two Ohio Managers Named

Appointment of managers for two Oil Well Supply Co. stores in Ohio recently were announced.

Karl F. Gano was named manager of the Newark store and William A. Grosenburg, manager of the Zanesville store. They succeed Ralph G. Oldaker and B. E. Grey, respectively, who have been transferred to field sales duties.

Gano has been a storeman at the Newark store for the past 2 years and Grosenburg has been a storeman at Zanesville since June 1947. Both are native Ohioans and World War II veterans.

## Corbett Celebrates Silver Anniversary

Corbett Corp., refinery and pipeline suppliers of Houston, are celebrating their twenty-fifth anniversary

*J. B. GIBSON*

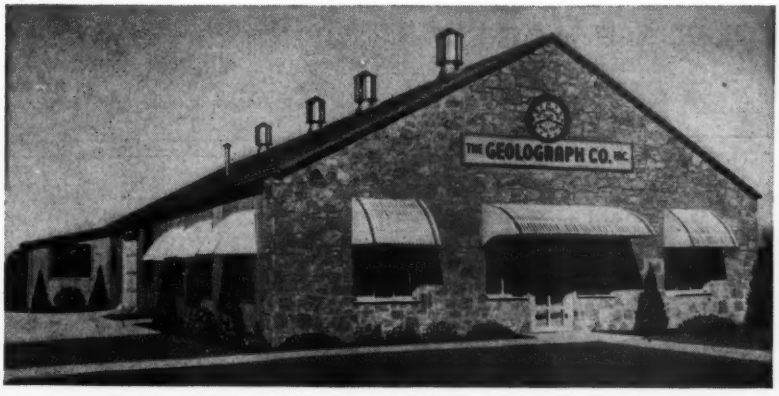
*C. L. WILLIAMS*

as a service organization in this field.

The late E. B. Corbett, who founded the organization, was well known throughout the industry for his progressive attitude and his belief that the basis of the success of a supply house lies in the service it renders. At his death, active management and the presidency of the organization have been placed in J. B. Gibson who has been active in all the ramifications of supply for some 22 years. Gibson resides with his family in Houston.

Corbett Corp. includes in its territory all of the Gulf Coast, Central Texas, including the Dallas area, and East Texas. A large stock is maintained of the major products of some 14 companies of national repute. Some 31 employes and 17 vehicles comprise its service unit. In 1941 a new modern office was built and since then additional acreage has been purchased for stock pile storage.

Other officers of the corporation include C. L. Williams, vice president and secretary. Williams has been with the organization 12 years. E. E. Nicholson is treasurer and has served since its inception.




***New building of Geolograph Co. at 27 N.E. 27th, in Oklahoma City, has been designed and built to give maximum efficiency in every activity of its mechanical well-logging service. Offices are well lighted, and conveniently arranged. Manufacturing space has been scientifically arranged and all modern methods incorporated into production of precision equipment***

# Classified Advertising

***The Market Place for the Oil Industry***

### UNDISPLAYED

All ads, 10 cents a word. Minimum charge, $2.00 per insertion.
Centered Line, any ad, 75 cents.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

### DISPLAYED, PER INCH

$10.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

**THE OIL AND GAS JOURNAL**
**P. O. Box 1260, TULSA, OKLAHOMA**

## EQUIPMENT FOR SALE

**FOR CABLE TOOLS**
**DEGEN PIPE AND SUPPLY CO.**
**Box 107, Red Fork Station, Tulsa, Oklahoma**

FOR SALE—R. L. Cardwell sub frame with beam, temper screw, rod hanger & header. Complete less draw works. Drilled in 6 wells. One-half price. One telescoping mast 8" & 7" 3 sheve crown. Wood Drilling Co. Pho. 154, Hoisington, Kansas.

### HALF TRACK SALE

Slightly used Half Track Trucks powered by 160 H.P. White Engines (Manufactured by White Motor Truck Company). Excellent for high speed towing, transportation under adverse weather conditions, mounting cranes or other special equipment; makes excellent shop or service truck. A combination Tractor—Truck—Wrecker that can drive on front and rear axles, or rear axle can be disengaged. Front tires are 8.25 x 20; ten speeds forward; two speeds reverse. Weighs approximately 14,000 lbs. Some models are complete with Tulsa Winch. Original cost to Government about $8,000.00. Sale Price $895.00 to $1250.00. Located at Pueblo, Colorado; Salt Lake City, Utah, and Dallas, Texas. Send inquiries to

**BERNSTEIN BROTHERS**
**(Since 1890)**
**PUEBLO, COLORADO**

## EQUIPMENT FOR SALE

FOR SALE: Practically new Wilson Single Engine Counter shaft Mogul Draw Works complete with 145 GKU Waukesha engine, electrical starting equipment, gas, gasoline, and butane hookup. Water cooled brakes. LUKE GRACE DRILLING COMPANY, 1009 City National Building, Wichita Falls, Texas.

FOR SALE: One All-Steel Spudding Machine with O.C.S. sand reel, calf wheel, bull wheel, with spooling room for 6000' of ⅞ line, mounted on rubber, equipped to haul as semi-trailer, 60 ft. heavy duty mast. McComas Oil Field Supplies, Blackwell, Oklahoma.

**FOR SALE—STEEL STORAGE TANKS**

5—10,000 bbl. unused A.P.I. bolted type. 7 and 10 ga. with 14 ga. deck. Will erect on your site.

**WM. ROSS**
1 Drumm St. San Francisco, Calif.

**PARTS FOR ARMY TRUCKS**

**New and Used**

**Largest stock in America, 6x6, 6x4, 4x4, 4x2. All items guaranteed. Largest auto wrecking house in the west with most complete stock of new and reconditioned parts for all cars and trucks. New jeep power units complete with radiators and stub shafts. Fast service.**

**PIONEER AUTO WRECKING CO.**
**732 W. 13th Ave. Denver 17, Colo.**

**WE BUY and SELL**

Steel Pipe and Tubing
Pipe Fittings—Well Casing
Culverts and Valves

**SONKEN-GALAMBA CORP.**

**2nd & Riverview, Kansas City 18, Kans.**

## EQUIPMENT FOR SALE

RECONDITIONED drilling equipment for deep or shallow wells. Spudders, beams, light rotaries, core drills. Tools, casing, cable. Good used equipment at money-saving prices. Pressey & Son, Pueblo, Colo.

FOR SALE: 10,000 ft. New 3½" 13.30#, Internal Upset, Range 2, API Drill Pipe, complete with tool joints. Regular price. Box C-301, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 360 hp., 4 cylinder, 225 r.p.m. Hope gas engine with outboard bearing, stub shaft and air starting equipment. Can be inspected on foundation central Texas. Box C-393, The Oil and Gas Journal, Tulsa, Oklahoma.

**10,000 and 5,000 Barrel**
**NEW A.P.I. BOLTED STEEL TANKS**
**In stock delivery and erection**
**Mid-Continent Field**

**McGUFFIN TANK CO.**
**Shreveport, Louisiana**
**(Distributor Columbian Steel Tanks)**

**FOR SALE**

**12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.**

**ENGLE PETROLEUM, Incorporated**
**Box 655, Evansville, Indiana**

**PUMPS**

Centrifugal and Reciprocating Chrysler Industrial Engines. Write for list and prices.

**H. A. McCARTHY**
**310 Thompson Bldg., Tulsa, Oklahoma**
**Phone 5-3296**

**FOR SALE**

**49-C Star Spudder with 165 H.P. motor (Gas or Gasoline)—in good shape for drilling to 5000'. Tools, equipment and 3500 drilling line, location near Durant, Oklahoma.**

**Write Box 1098**
**SHAWNEE, OKLAHOMA**

**FOR SALE**
**DIESELS and PUMPS**

Six new 1947 unused 475 BHP 5 cylinder Baldwin Model VG Diesel Engines, four connected to Ingersol-Rand Multi-stage Centrifugal Pumps with Farrel-Birmingham Step-up Gears and two connected to Worthington Horizontal Triplex Double Acting Pumps, all units complete with Falk Couplings, Lummus Coolers, other accessories. Location Ohio, immediate delivery. Direct inquiries to

**THE BUCKEYE PIPE LINE COMPANY**
**Joseph Steele, Purchasing Agent,**
**Room 2200, 30 Broad Street,**
**New York 4, N. Y.**

**REFINERY EQUIPMENT**
**DISMANTLED READY FOR IMMEDIATE SHIPMENT**

| | |
|---|---|
| **Towers and Vessels** | **Valves and Fittings** |
| **Pumps and Compressors** | **Tanks, bolted—welded—riveted** |
| **Exchangers and Condensers** | **Boilers** |
| **Turbines** | **Instruments and Controls** |

**Located at Enid and Tulsa, Oklahoma. Used less than 15 months.**
**Guaranteed first class condition. Inspection invited.**

**PETROLEUM EQUIPMENT, INC.**

**P.O. Box 867** **Thrasher Building**
**Tulsa, Oklahoma** **Telephone 2-6291**

**FOR SALE**
**STEEL STORAGE TANKS**

3—8000-Gallon, R.R. Tank Car Tanks Coiled and Non-Coiled
1—9800-Gallon, Horizontal Tank, Non-Coiled
3—10,000-Gallon, Horizontal Tanks, Non-Coiled
2—10,000-Gallon, R.R. Tank Car Tanks, Coiled and Non-Coiled
1—12,000-Gallon, R.R. Tank Car Tank, Coiled
1—15,000-Gallon, Horizontal, Non-Coiled
1—5,500-Barrel, Vertical, Bolted Tank.

**IRON & STEEL PRODUCTS, INC.**
43 years' experience
13412 S. Brainard Ave., Chicago 33, Ill.
**"ANYTHING containing IRON or STEEL"**

**LEASE AND DRILLING BLOCKS**

FOR SALE: 8000 acres of Oil Shale in one body near Dubec, Colo. Heart of the oil shale deposits. John C. Herr, Wickenburg, Ariz.

HAVE ten thousand acres oil and gas leases, in Sierra County, New Mexico, on structure known as "The Alamosa Dome," good Government and other geology, surface shows positive inclosed structure, on direct trend with San Juan basin field, and Lea and Eddy County. Will give good share of acreage for test well to a depth of six thousand feet unless production should be found at a lesser depth. These are mostly Government and State leases with long terms and low rentals. This will bear rigid investigation. If interested, write C. M. Wilson, Box 226, Hot Springs, New Mexico.

WHY NOT FILE for Government oil lease on reservation lands opened under new law. Its opportunity in developing area. S. W. Pressey, Pueblo, Colo.

**DEVELOPMENT IN CUBA UNDER WAY**

To expand drilling Jarahueca field producing 1000 b/d (37 A.P.I.) want parties furnish spudders for 2500' tools, casing. Drilling cost borne by us. We offer 1/10 first 5 wells plus value of equipment. Will also lease, sell lots and overriding royalties. Cracking plant in operation. Write to

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**PATENT ATTORNEYS**

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell. Registered Patent Attorneys, Suite 418, 815-15th Street, N. W., Washington 5, D. C.

**PERSONAL**

**Application for Membership in the Diesel Engineers International Assn.**
**576 Newark Ave., Jersey City, N. J.**
Name .....
Address .....
Reference .....


## Oklahoma Fields

(Continued from page 137)

Lincoln County: Anderson 1 Woolcott, SE SE SE 20-15n-4e, dry, TD 4,381 ft., Verdigris 3,955 ft., Inola 4,254 ft., no Bartlesville, brown lime 4,353 ft.

Johnson 1 Cavanaugh, NW SW NE 31-15n-5e, dry, TD 3,594 ft., Hogshooter 2,500 ft., Layton 2,530 ft., Oswego 3,532 ft., Prue 3,589 ft.

Murray County: Helmerich 1 Cooper, SW SW NW 25-2n-1e, dry, TD 4,643 ft., Arbuckle 4,640 ft., basal Pennsylvanian-Viola 2,940 ft., Trenton 2,980 ft., bromide dense 3,040 ft., sand 3,250-3,300 ft. and 3,320-3,410 ft., McLish 3,410 ft., sand 3,600-40 ft. and 3,690-3,800 ft., Oil Creek 3,800-3,940 ft.

Oklahoma County: Zephyr 1 Lovell, NE NE SE 21-14n-1e, dry, TD 5,672 ft., Pawhuska 2,013 ft., Hoover 2,400 ft., Tonkawa sand 2,950 ft., Hogshooter 3,912 ft., Layton 3,940 ft., conglomerate 4,216 ft., upped Oswego 4,710 ft., lower Oswego 4,757 ft., Prue 4,833-90 ft., Verdigris 4,917 ft., Skinner 4,925 ft., Red Fork 5,020 ft., basal Pennsylvanian - Mayes 5,215 ft., Woodford 5,241 ft., Sylvan 5,332 ft., Viloa 5,438 ft., dense 5,471 ft., dolomite 5,508 ft., Wilcox 5,525 ft., second Wilcox 5,623 ft.

Double R Drilling 1 Lincoln Park, NW NW NW 13-12n-3w, dry, TD 7,319 ft., unconformity 6,541 ft., Bois d'Arc 6,616-74 ft., Sylvan 6,913 ft., Viola 7,010 ft., dense 7,072 ft., second Wilcox 7,301 ft.

Pottawatomie County: Harper-Turner 1 McBride, SW SE NE 7-9n-4e, dry, TD 5,529 ft., dense 5,286 ft., dolomite 5,330 ft., Wilcox 5,364 ft., second Wilcox 5,502 ft.

Seminole County: Powell 1 Swan, NE NE NW 33-6n-6e, dry, TD 1,659 ft., Calvin 1,644 ft.

McMahon 1 Homestake, NW SE NW 7-8n-8e, dry, TD 3,584 ft., Wewoka 1,505 ft., Calvin 1,630 ft., lower Calvin 1,800 ft., Senora sand 2,230 ft., Booch 3,201 ft., Gilcrease 3,340 ft., Wapanucka 3,474 ft., Cromwell 3,530 ft.

Stephens County: Wirick 1 Culver, E/2 SW SW NW 17-3s-4w, dry, TD 2,325 ft., sand 2,198-2,212 ft., Arbuckle 2,230 ft. and 2,260 ft.

# Pay Increases Given By Two Companies

MAGNOLIA PETROLEUM CO. and two locals of the Oil Workers International Union in Beaumont have reached an agreement calling for an across-the-board wage increase of 17½ cents an hour.

The new contract covers about 2,500 workers and is effective June 1 for a period of 1 year. Eight cents of the increase is retroactive to February 1, and the remainder with the effective date of the contract.

The increase follows the pattern set by the Sinclair companies in their recent settlement with the union, according to union officials. Magnolia operates a 125,000-bbl. daily refinery in Beaumont.

Meanwhile, a cost-of-living increase in pay of 6 per cent to all salaried employes of Continental Oil Co., effective July 1, was announced by President L. F. McCollum. The present cost-of-living bonus will be converted to base pay, and the minimum increase under the new rates will be $17.50 per month and the maximum $40.00. The increase does not apply to the president, chairman of the board and vice presidents.

At the same time McCollum announced that a cost-of-living increase of 10 cents an hour will be paid to all hourly paid nonunion employes with the present 8 cents an hour cost-of-living bonus in effect since March 1, 1948, being converted to the base rate.

"The same offer has been made to union employes," said McCollum. "As a result of this increase the hourly paid employes of Continental have received during 1948 a minimum increase of 18 cents an hour and since November 1946 a minimum of 42½ cents an hour."

## New MER for Texas Fields

AUSTIN.—Revisions of maximum efficient rates of production for Texas oil fields are expected to be announced by the Texas Railroad Commission some time the latter half of June.

**LEGAL**

Notice is hereby given that oil and gas leases on the following described Crow Tribal lands will be offered at public auction at the Crow and Northern Cheyenne Agency, Crow Agency, Montana, at 2 o'clock P. M., M. S. T., June 15, 1948.

Unit No. 1. Description: In Township 9 South, Range 37 East. Sec. 15: S½; Sec. 16: S½; Sec. 17: SE¼; Sec. 20: E½; Sec. 21: All; Sec. 22: All. Acreage 2400.00.

Unit No. 2. Description: In Township 9 South, Range 37 East. Sec. 28: All; Sec. 29: E½, SW¼; Sec. 32: N½, N½S½, Lots 1, 2, 3, 4; Sec. 33: N½, N½S½, Lots 1, 2, 3, 4. Acreage: 2331.73.

Unit No. 3. Description: In Township 9 South, Range 37 East. Sec. 31: NE¼, N½ SE¼, Lots 1, 2, 3, 4, 5, 6. Acreage: 474.58.

Unit No. 4. Description: In Township 9 South, Range 37 East. Sec. 13: SW¼; Sec. 14: S½; Sec. 23: All; Sec. 24: All. In Township 9 South, Range 38 East. Sec. 19: E½ SW¼, Lots 3, 4; Sec. 29: NW¼; Sec. 30: NE¼, E½NW¼, Lots 1, 2. Acreage: 2392.30.

Unit No. 5. Description: In Township 9 South, Range 37 East. Sec. 26: All; Sec. 27: All; Sec. 34: N½, N½S½, Lots 1, 2, 3, 4; Sec. 35: N½, N½S½, Lots 1, 2, 3, 4. Acreage: 2516.08.

Unit No. 6. Description: In Township 9 South, Range 37 East. Sec. 25: All; Sec. 36: N½, N½S½, Lots 1, 2, 3, 4. In Township 9 South, Range 38 East. Sec. 30: E½SW¼, SE¼, Lots 3, 4; Sec. 31: E½, E½W½, Lots 1, 2, 3, 4. In Township 10 South, Range 38 East. Sec. 6: NE¼, E½NW¼, Lots 1, 2, 3, 4, 5, 6. Acreage: 2669.22.

Unit No. 7. Description: In Township 9 South, Range 38 East. Sec. 29: S½; Sec. 32: All; Sec. 33: All. In Township 10 South, Range 38 East. Sec. 4: N½, Lots 1, 2, 3, 4; Sec. 5: N½, Lots 1, 2, 3, 4. Acreage: 2560.59.

This sale will be conducted under the regulations prescribed by the Secretary of the Interior (Part 195, Title 25, Code of Federal Regulations). The leases will be sold to the highest responsible qualified bidder for a cash bonus upon an acreage basis in addition to the royalty of 12½ per cent and rental of $1.25 per acre per annum. The successful bidder must deposit with the superintendent on the day of the sale a certified check or bank draft on a solvent bank in an amount equal to 20 per cent of the bid and of the first year's rental as a guaranty of good faith. The balance of the bonus bid and of the first year's rental shall be paid and the lease in completed form shall be filed with the superintendent within 20 days from the date it is received by the successful bidder for execution. Failure in those conditions may subject the bid to cancellation and the forfeiture of payments already made.

No individual corporation, partnership, company or association shall hold oil and gas leases covering Indian Tribal lands and restricted allotted Indian lands on any one Indian reservation in excess of 25,000 acres except in the state of Oklahoma, in which state there is no acreage limitation.

Leases shall be made for a period of ten years from date of approval by the Secretary of the Interior with the right of renewal for an additional period of ten years upon such terms and conditions as the Secretary of the Interior may prescribe and by showing to the satisfaction of the Secretary of the Interior that the leased premises are producing oil or gas in paying quantities.

The right is reserved by the Secretary of the Interior to reject any and all bids and to disapprove and reject prior to approval any lease made on an accepted bid; and should any bid be rejected or lease be disapproved through no fault of the bidder, after deposit has been made, such deposit shall be immediately returned. Each successful bidder shall pay a prorata share of the cost of advertising.

For further information call or write L. C. Lipport, Superintendent. Date: May 14, 1948.

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# CALENDAR

**June**

Southern Gas Association, third annual short course in gas technology, Texas College of Arts and Industries, Kingsville, Tex., June 2-4.

National Oil Scouts & Landmen's Association, annual convention, Denver, June 3-5

Petroleum Equipment Suppliers' Association, annual meeting, Broadmoor Hotel, Colorado Springs, June 6-8.

Society of Automotive Engineers, summer meeting, French Lick Springs Hotel, French Lick, Ind., June 6-11.

Pennsylvania Grade Crude Oil Association, twenty-fifth anniversary meeting, Hotel William Penn, Pittsburgh, Pa., June 17.

Rocky Mountain Oil and Gas Association, mid-year meeting of the board of directors, City Auditorium at Cody, Wyo., June 18-19.

Kentucky Oil and Gas Association, annual meeting, Hotel Lafayette and Phoenix Hotel, Lexington, Ky., June 17-18.

American Society of Testing Materials, fifty-first annual meeting, Book-Cadillac Hotel, Detroit, Mich., June 21-25.

American Petroleum Institute, Division of Production, eastern district meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., June 30, July 1-2.

Canadian Gas Association, annual convention, Jasper Park Lodge, Jasper, Alta., June 30-July 3.

**August**

Appalachian Gas Measurement Short Course, eighth annual session, West Virginia University School of Mines, Morgantown, W. Va., August 30-September 1.

**September**

American Chemical Society, Division of Petroleum Chemistry, fall meeting, St. Louis, September 6-10.

The Instrument Society of America, third instrument conference and exhibit, Philadelphia Convention Hall, Philadelphia, September 13-17.

Pacific Coast Gas Association, annual convention, Hotel Casa del Rey, Santa Cruz, Calif., September 14-16.

**October**

American Institute of Mining & Metallurgical Engineers, petroleum division, fall meeting, Adolphus Hotel, Dallas, October 4-6.

American Association of Petroleum Geologists, midyear meeting, technical session and 3-day field trip, Pittsburgh, Pa., October 4-9.

American Gas Association, annual convention, technical section, Ambassador Hotel, Atlantic City, October 4-9.

National Lubricating Grease Institute, sixteenth annual convention, Edgewater Beach Hotel, Chicago, October 11-13.

American Association of Oilwell Drilling Contractors, eighth annual meeting, Rice Hotel, Houston, October 11-13.

Texas Mid-Continent Oil and Gas Association, twenty-ninth annual meeting, Fort Worth, October 14-15.

American Institute of Mining & Metallurgical Engineers, petroleum division, fall meeting, Elks' Club, Los Angeles, October 14-15.

**November**

American Petroleum Institute, annual meeting, Stevens Hotel, Chicago, November 8-11.

American oil Chemists' Society, fall meeting and technical sessions, Pennsylvania Hotel, New York, November 15-18.

**March 1949**

New England Gas Association, Hotel Statler, Boston, March 24-25.

**NOMADS**

**Houston Nomads, second Monday of each month, The Houston Club, Houston.**

**Los Angeles Nomads, second Wednesday each month, Jonathan Club.**

**New York Nomads: Golf party, June 10, at Westchester Country Club. Golf party, Sept. 21, at Baltusrol Country Club, N. J.**

## Permian Basin

(Continued from page 135)

ft., Detrital 4,285 ft., Ellenburger 4,336 ft., elev. 1,692 ft.

Schleicher County: Taylor Refining Co. 1 Christena Mittall, Sec. 75, Blk. TT, TC-RR Sur., 12 mi. NE of Eldorado, dry, TD 6,830 ft., Strawn reef 5,970 ft., Detrital 6,605 ft., Ellenburger 6,630 ft., elev. 2,208 ft.

**SOUTHEASTERN NEW MEXICO**

HOBBS.—Two new wildcat locations were made last week in Lea County, and one in Eddy County. The Lea ventures are: Repollo Oil Co. 1 Elmer C. Hill, SE SE 26-21s-37e, 3 miles northeast of Eunice, which will drill to 6,700 ft.; Amerada Petroleum Corp. 1 Rushing, SW SW 3-11s-32e, northeast of the Caprock townsite and about 10 miles northeast of the Caprock field, which is projected to 3,700 ft.

In Chaves County, DeKalb Agricultural Co., Inc., made location for its 4 J. P. Whitem, NW NE 18-10s-29e, which places it about 27 miles east of Roswell. It is contracted to 2,500 ft.

In the new Crossroads field of northeastern Lea County, Magnolia Petroleum Co. abandoned location for its 1-B Santa Fe-Pacific, in 26-9s-36e, at least temporarily, and instead made location for the 1-C Santa Fe-Pacific, SW SW 26-9s-36e, ½ mile south of the abandoned location and ½ mile east of the discovery well.

In Eddy County, Magnolia 1-W State, 16-21s-22e, was drilling below 10,641 ft. in dry, unidentified dolomite. No shows have been reported.

**SOUTHEAST NEW MEXICO WILDCAT FAILURE**

Eddy County: Southern Union Production Co. 1 Elliott, SW SW 24-18s-23e, 25 mi. SW Artesia, dry, TD 9,887½ ft. in pre-Cambrian, San Andres 2,748 ft., Glorietta 1,491 ft., Pennsylvanian 4,805 ft., Mississippi 8,265 ft., Devonian 8,725 ft., Simpson 9,660 ft., Ellenburger 9,805 ft., pre-Cambrian 9,883 ft., elev. 3,866 ft.



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